DOCUMENT RESUME

ED 202 959 UD 021 458

TITLE Minimum Teaching Essentials: Grades 5-9. Mathematics, Science, Health Education, and Physical Education.

INSTITUTION New York City Board of Education, Brooklyn, N.Y. Div. of Curriculum and Instruction.

REPORT NO ISBN-88315-458-7; NYCBE-CB-01-0000-81

PUB DATE 79

NOTE 313p.; Some tables and credits may be marginally legible due to small type size. For related documents, see ED 181 828, ED 190 695, UD 021 456-460, UD 021 463-471, and UD 021 474.

EDRS PRICE MF01/PC13 Plus Postage.

DESCRIPTORS Career Education; Child Development; *Communication Skills; Elementary Secondary Education; Grade 5; Grade 6; Grade 7; Grade 8; Grade 9; *Health Education; Lesson Plans; *Mathematics; *Minimum Competencies; *Physical Education; *Science Instruction; Study Skills; Teaching Methods

IDENTIFIERS *New York City Board of Education

ABSTRACT

This guide presents the "minimum teaching essentials" published by the New York City Board of Education. Subjects covered include: (1) communication arts (K-9); (2) health education (grades 5, 6, and 8); (3) mathematics (grades 5-9); (4) physical education (grades 5-9); and (5) science (grades 5-9). Work study skills are given for each subject with content areas and descriptors provided for specific skills and knowledge. Sections on career education, child development, and work study skills are also included. Appended is a list of curriculum publications. (Author/APM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED202959

MINIMUM TEACHING ESSENTIALS

Grades 5-9

Mathematics, Science, Health Education and Physical Education

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

R. Edmonds
NYC Public Schools

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

NEW YORK CITY BOARD OF EDUCATION
OFFICE OF CURRICULUM DEVELOPMENT AND SUPPORT • DIVISION OF CURRICULUM & INSTRUCTION

UD021458

ISBN NO. 88315-458-7
CURR. NO. 01-0000-81

MAY 2 6 1981

MINIMUM TEACHING ESSENTIALS

Grades 5-9

Mathematics, Science, Health Education and Physical Education

NEW YORK CITY BOARD OF EDUCATION
OFFICE OF CURRICULUM DEVELOPMENT AND SUPPORT • DIVISION OF CURRICULUM & INSTRUCTION

NEW YORK CITY BOARD OF EDUCATION

Joseph G. Barkan, *President*

Miguel O. Martinez, *Vice President*

Amelia H. Ashe
Robert H. Christen
Irene Impellizzeri
Marjorie A. Lewis
James F. Regan

Frank J. Macchiarola, *Chancellor*

Richard Halverson, *Deputy Chancellor*

Charlotte Frank, *Executive Director*
Division of Curriculum and Instruction

COPYRIGHT 1979 by the Board of Education of the City of New York
First Printing, 1979. Reprinted 1980.

Application for permission to reprint any section of this material should be made to the Chancellor, 110 Livingston Street, Brooklyn, New York, 11201. Reprint of any section of this material should carry the line, "Reprinted from Minimum Teaching Essentials by permission of the Board of Education of the City of New York."

Contents

FOREWORD.....v

ACKNOWLEDGMENTS.....vii

INTRODUCTION.....1

CAREER EDUCATION.....3

COMMUNICATION ARTS.....13

HEALTH EDUCATION.....53

MATHEMATICS.....67

PHYSICAL EDUCATION.....93

SCIENCE.....115

WORK STUDY SKILLS.....151

CHILD DEVELOPMENT FOCUS.....157

CREDITS.....163

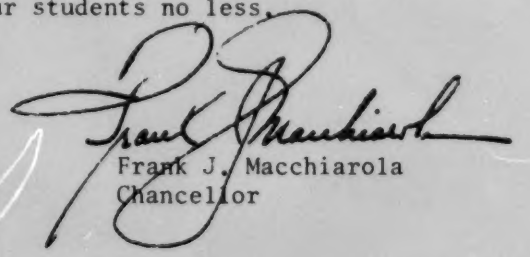
Appendix: Curriculum Publications.....171

Foreword

Decentralization imposes upon District Community School Boards the responsibility to control and operate, in a form consistent with the policies of the Central Board of Education, all pre-kindergarten, nursery, kindergarten, elementary, intermediate, and junior high schools. Community Boards also decide matters of instruction and select textbooks and ancillary materials, subject to the prior approval of the Chancellor. Decentralization thus allows districts the flexibility and differentiation necessary to meet the varying needs of their students.

At the same time, the decentralization law also continues the power vested in the Office of the Chancellor to "promulgate minimum educational standards and curriculum requirements for all schools and programs throughout the city district."* It is hoped that Minimum Teaching Essentials K-9 will provide every educator with the knowledge of what must be taught in content and basic skills for each grade level in all curriculum areas, thus offering every student an instructional program governed by the approved curriculum. Presenting such essentials is also a step toward creating the continuity of instruction desirable for a city with high pupil mobility.

Students in most classrooms will be taught more than is specified as a minimum. Supervisors and teachers will innovate, enrich, and extend curricula whenever possible. But this bulletin forms the teaching base required to maintain educational standards and ensure appropriate learning opportunities in every classroom. We can offer our students no less.



Frank J. Macchiarola
Chancellor

* New York State Education Law, Article 52, paragraph 2590-h.

Minimum Teaching Essentials: Grades 5-9, Mathematics, Science, Health Education, and Physical Education is excerpted from Minimum Teaching Essentials: Grade K-9 published in 1979. Only the section on Communication Arts is reproduced in its entirety because of its integral relationship to all other subject areas.

Acknowledgments

The curriculum publication, Minimum Teaching Essentials K-9, was initiated by Irving Anker, former Chancellor of the New York City Public School System. Both the experimental and the revised editions were prepared as projects of the Division of Curriculum and Instruction, Arnold Webb, Executive Director*.

Grateful appreciation is extended to all the supervisors and staff of the Centers within the Division of Curriculum and Instruction. Without their support, cooperation and expertise, this document would not have been possible. Charlotte Frank, Director of the Center for Curriculum Development, was responsible for coordinating the contributions of the subject area Centers and preparing the manuscript for publication. The supervisors who were responsible for development of the materials are listed below under their contributing Center.

Arts and Humanities: Florence Jackson, Director; Grace George Alexander-Green, Head of Art Unit; Anita Dore, Director of English; David Weiss, Assistant Director of Foreign Languages; John Butler, Director of Music; Albert Post, Assistant Director of Social Studies

Bilingual Education: Hernan Lafontaine, Executive Administrator

Career and Occupational Education: George Quarles, Chief Administrator; Juanita Ward, Project Director, Career Education Unit; Herbert Siegal, Director of Industrial Arts; Kathleen Rogers, Director of Home Economics; Norman Watnick, Assistant Director of Business and Distributive Education

Health and Physical Education: Irwin Tobin, Director; Bernard Kirschenbaum and Angela Zirpiades, Assistant Directors of Physical Education; Melvin Warren, Assistant Director of Health Education

*The organizational structure and titles throughout the acknowledgments are those in effect at the time of initial printing.

Mathematics and Science: Frank Wohlfort, Assistant Director of Mathematics; Sam Fried, Assistant Director of Science
School Development: Hortense Jones, Director
Library, Media and Telecommunication: Morris Freedman, Director; Geraldine Clark, Assistant Director, Head of Library Unit
Reading: Marian Power, Director (Acting)

Special thanks is extended to teachers, school and district supervisors and members of institutions of higher education whose suggestions have contributed greatly to this document.

Because of the large number of individual contributors, names have been listed in the section entitled Credits.

Introduction

This revised edition of Minimum Teaching Essentials K-9 presents the minimum in basic skills and knowledge which must be taught within each curriculum area. It does not constitute the full scope of the various courses of study. It should also be noted that this publication does not include teacher methodology, student attitudes and appreciations, or moral and ethical values. Previously published bulletins provide the necessary support to help education design and implement the complete and appropriate curriculum. The purpose of this document is to provide administrators, teachers, parents, and other members of the educational community with a comprehensive resource which identifies, within all disciplines, the basic body of knowledge and skills to be taught at each grade or level.

The organization of the bulletin begins with a broad perspective of each subject area. These statements highlight the major components of the individual disciplines and indicate the role each area plays in the total educational process. Statements of the philosophy, goals, and guidelines for bilingual education are included. Career education is represented with basic understandings for each grade.

Reading and language arts are integrated as "communication arts," reflecting the interdependent nature of listening, speaking, reading, and writing. This arrangement also reinforces the principle that specific reading skills are a means to increase students' abilities to read for pleasure and information, and are not ends in themselves. The communication arts section is presented in uninterrupted sequence K-9 and precedes the other subject areas.

A child development focus appears before grades K-2, 3-5, and 6-9. This section reviews children's basic psychological needs, and the physical, socio-emotional, and intellectual growth patterns expected of a particular age group. The work-study skills used in all subject areas are presented in chart form for K-2, 3-5, and 6-9.

English as a second language and foreign languages in the elementary school (FLES) are also treated by levels and precede the subjects which are grouped by grade. Specialized subjects for the intermediate or junior high school are presented course by course. These are: foreign languages, home economics, industrial arts, and typewriting.

All other curriculum subjects within a grade level are grouped together, i.e., for the third grade the order is art, health education, library-media, music, physical education, science, and social studies. Each page presents content area and/or topics with descriptors for specific skills and knowledge. References for suggested classroom implementation are keyed to existing bulletins where relevant. Bulletin titles are found on the first page of subject areas for each grade. Some subjects offer suggestions for the number of days or weeks to be devoted to a topic within that area.

The publication of this bulletin represents a major step in establishing minimum curriculum essentials. The translation of these standards into effective learning for every student will be realized only with the creative skill and dedication of all of us in the educational community of New York City.

Arnold Webb
Executive Director

Career Education
Grades 5-9

CAREER EDUCATION

Career education is an educational approach which seeks to provide students with the knowledge and skills necessary for becoming self-fulfilled and productive members of society. It incorporates large components of the humanistic and experiential learning movements, and seeks to educate the total person. It is as concerned with the development of basic academic skills as it is with the development of career awareness and occupational skills. It seeks to expand, not narrow, the learner's career horizons by incorporating into the regular curriculum concepts of personal growth and career development. Career education is a process, not a product. It is a process which seeks to make the educational experience more meaningful through bridging the gap between what is taught in the classroom and what the learner perceives as going on in the "real" world.

To accomplish this, it offers a variety of strategies sculpted around the concept of working its eight essential elements into the classroom on a daily basis. These elements are:

- .self awareness
- .decision-making skills
- .attitudes and appreciations
- .economic awareness
- .educational awareness
- .career awareness
- .beginning competencies
- .employability skills

Such elements as career awareness, educational awareness, and economic awareness seek to inform the learner of the broad vista of career possibilities; establish a link between what is being taught in school and what goes on in the world outside the classroom, and give the learner an understanding of the roles of consumer, producer, and provider as these operate in the larger economic society.

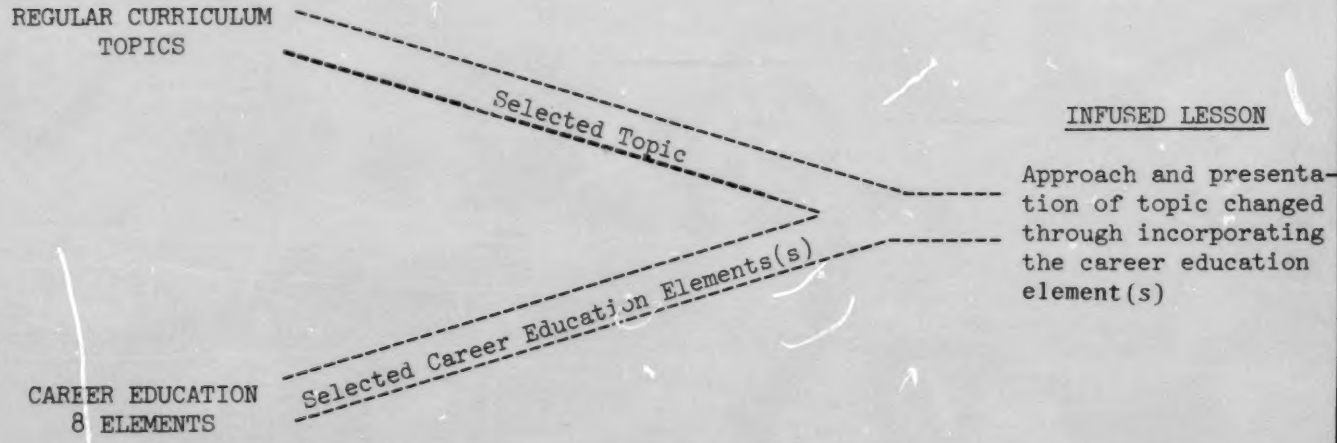
Such elements as self-awareness, decision-making skills, and attitudes and appreciations seek to give learners insight into their own abilities, interests, and thought processes; and help them understand the dynamics of decision-making:

foreseeing consequences, considering alternatives, making a decision, acting on it, and assessing the outcome; provide them with decision-making experiences in real and simulated situations; assist them in exploring personal values, and in relating these values to school experiences and possible career options.

Such elements as beginning competencies and employability skills seek to give learners a strong foundation of basic academic and manipulative skills essential to success in school and work and provide them with the specific skills necessary for further education or training, or for entry-level employment. An emphasis on "hands-on," learning by doing, is a shaping factor of all career education.

The main strategy for implementing career education in the classroom is infusion. Infusion is the incorporation of at least one of the eight career education elements mentioned above into the regular curriculum, giving the resultant lesson, be it math, science, language arts, social studies, or some other subject area, a career education focus (see diagram).

Career education is much more, then, than just teaching about jobs. On the following pages, basic understandings for each grade, 5 - 9 , are presented to provide a framework for career education implementation at the classroom level. These outcomes are adapted from the National Career Education Model Goal Statements.


REGULAR CURRICULUM TOPICS
Selected Topic
INFUSED LESSON
Approach and presentation of topic changed through incorporating the career education element(s)
Selected Career Education Elements(s)
CAREER EDUCATION 8 ELEMENTS

In addition to the infusion of a career education element, occupational information may frequently be incorporated in a lesson. The Basic Occupational Clusters into which careers are grouped are:

Health
Marine Science
Consumer and Homemaking Education
Manufacturing
Marketing and Distribution
Public Service
Agri-Business and Natural Resources
Communications and Media
Transportation
Fine Arts and Humanities
Personal Services
Construction
Environment
Business and Office
Hospitality and Recreation

CAREER EDUCATION GRADE FIVE

ELEMENT	BASIC UNDERSTANDING
SELF AWARENESS	The worker has both rights and responsibilities.
DECISION MAKING	The decision-making process can be applied to school-related problems.
ATTITUDES AND APPRECIATIONS	Working roles have advantages and disadvantages.
CAREER AWARENESS	Different lifestyles are associated with each occupational cluster.
ECONOMIC AWARENESS	There is a law of supply and demand.
EDUCATIONAL AWARENESS	The role of the individual is related to environment and to the roles of selected adults.
BEGINNING COMPETENCY	Mass production calls for division and specialization of labor. Measurement tools can be mastered.
EMPLOYABILITY SKILLS	The school environment is related to the larger society and has similar needs for structure and order.

CAREER EDUCATION GRADE SIX

ELEMENT	BASIC UNDERSTANDING
SELF AWARENESS	An understanding of one's strengths and preferences helps in the selection of appropriate career clusters.
DECISION MAKING	The decision-making process can be applied to home and social-related problems.
ATTITUDES AND APPRECIATIONS	Personal growth and development are tied to one's occupational endeavors.
CAREER AWARENESS	Occupational clusters and the jobs within them require specific abilities and skills.
ECONOMIC AWARENESS	Specialization creates an interdependent society.
EDUCATIONAL AWARENESS	Reading, writing, number skills, and science are used in various occupational areas.
BEGINNING COMPETENCY	Tools and processes are used in research. Simple machines combine to produce complex machinery
EMPLOYABILITY SKILLS	The individual's role in society affects personal satisfaction and group achievement and morale.

CAREER EDUCATION GRADE SEVEN

ELEMENT	BASIC UNDERSTANDING
SELF AWARENESS	Interests and abilities are related to choice of occupational cluster.
DECISION MAKING	Alternative solutions to problems have different long and short-term effects.
ATTITUDES AND APPRECIATIONS	The value of work is not necessarily tied to its monetary rewards or social status.
CAREER AWARENESS	Attitudes and values relate to choice of occupational cluster.
ECONOMIC AWARENESS	Management of finances implies an understanding and control of earning, spending, borrowing, and saving.
EDUCATIONAL AWARENESS	Personal values relate to lifestyle.
BEGINNING COMPETENCY	Tools and processes used in research in the physical and social sciences can be mastered. A variety of tools is used in the different occupational clusters.
EMPLOYABILITY SKILLS	Social and personal relationships have an effect upon employment.

CAREER EDUCATION GRADE EIGHT

ELEMENT	BASIC UNDERSTANDING
SELF AWARENESS	Perception of abilities and interests is related to career choice.
DECISION MAKING	The decision-making process is applicable to choice of careers.
ATTITUDES AND APPRECIATIONS	The impact of work upon one's life necessitates meaningful career choices.
CAREER AWARENESS	Occupational clusters draw upon specific areas of interest and ability.
ECONOMIC AWARENESS	The cost of entering a career relates to future expected income.
EDUCATIONAL AWARENESS	There is a relationship between lifestyle and educational achievement.
BEGINNING COMPETENCY	Basic tools found in the occupational clusters can be mastered.
EMPLOYABILITY SKILLS	Personal and social interaction skills are related to occupational success.

CAREER EDUCATION GRADE NINE

ELEMENT	BASIC UNDERSTANDING
SELF AWARENESS	A better perception of reality comes from an awareness of where one is as compared to where one would like to be.
DECISION MAKING	Career decisions can be analyzed and refined in the light of counseling, work experience, and new information.
ATTITUDES AND APPRECIATIONS	Occupational clusters draw upon specific attitudes and appreciations.
CAREER AWARENESS	An understanding of interests, values, and abilities is essential to a study of occupational choices.
ECONOMIC AWARENESS	Interpreting tables, graphs, and charts is important to the consumer.
EDUCATIONAL AWARENESS	A personal schedule assists in the acquisition of necessary and desired special skills.
BEGINNING COMPETENCY	Skills and processes can be matched with specific career clusters.
EMPLOYABILITY SKILLS	Specific skills are necessary to find and hold a job and to succeed in one's chosen occupational field.

Communication Arts
Grades K-9

Overview.....15

Kindergarten.....17

Grade 1.....19

Grade 2.....23

Grade 3.....27

Grade 4.....31

Grade 5.....35

Grade 6.....39

Grade 7.....43

Grade 8.....46

Grade 9.....49

COMMUNICATION ARTS

Spoken and written language is the heart of the communication arts curriculum. The purpose of all language is to communicate. The speaker must speak so as to be understood; the listener must learn the skills of effective listening; the writer must develop the skills for communicating complex ideas; the reader needs all the complex skills necessary to absorb the written ideas of others.

In terms of education, increasing effectiveness in the four language processes -- listening, speaking, reading, and writing -- is based on two important premises:

When children arrive in school they already have achieved a degree of proficiency in at least one spoken language.

This ability is the beginning and the central tool for all learning which will ensue in the student's years of schooling.

As students mature physically and psychologically, their language skills spiral upward and outward together. The more words and ideas they can utter and understand, the more words and ideas they will be able to read and write.

In the early grades, children learn to appreciate and tell stories, decipher the code of writing, make phonic-graphic correspondence, and relate stories and ideas to their own thoughts and feelings. At the same time they grow in organizing ideas, using the structure of language, increasing vocabulary and learning the basic skills of spelling and penmanship.

By the middle grades, students are ready to apply their reading skills to content areas -- science, mathematics, social studies. They grow in sophistication, listening more perceptively, expressing themselves more articulately, and writing more fully and in greater depth.

In grades 7-9 students are gradually broadening their experience in a variety of literary genres, including selections from the past and present and familiar and foreign cultures presented in a range of styles and viewpoints. At the same time they are gaining skill in specific strategies for obtaining information in the content areas. They are also acquiring critical viewing and listening skills for appreciation and evaluation of film, radio, and television. In their oral and written communication students are ready to develop style and greater clarity of expression.

Thus, the goal of the communication arts is the development of language power so that students may engage effectively in communication with others orally and in writing, react perceptively to the spoken and written word, gain information from written and recorded materials, and understand the effects of communication on thinking and behavior. Ultimately, the goal is to grow in human understanding, in sensitivity, in responsiveness, and in creativity. At all times the student must be made aware that all the processes and skills taught in the communication arts curriculum are a means to this desirable end.

The Minimum Teaching Essentials in Communication Arts is divided into three strands:

Listening and Speaking stresses perceptive listening and effective oral communication.

Reading and Literature emphasizes reading as a means of gaining pleasure and information while developing necessary processes and skills.

Writing is presented as expressional and functional with the conventions of writing taught only as aids for the primary purpose of writing -- communication with a reader.

COMMUNICATION ARTS

The division of the curriculum into these strands is merely for ease of organization. In the classroom, listening, speaking, reading literature or content area materials, and writing are integrated in the learning experience.

This approach is holistic and ongoing. While the skills and knowledge presented at a grade level constitute the minimum which should be taught before children leave that grade, it does not mean that the same skills and knowledge may not be taught earlier or later. Language develops along a continuum and teachers are responsible for learning opportunities which engage the individual child, whatever his or her point on the continuum. Throughout the years of a child's education, learning in all strands of communication arts grows in depth and complexity as the child grows in confidence and maturity.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Listening is preparatory to developing a discriminating ear for the sounds and patterns of language. *pp. 40-2 Listening to stories develops an acquaintance with literature of the past and present. *pp. 53-54 Listening to stories develops knowledge of the structure of stories. *p. 54 Listening develops skill in identifying main ideas and sequence of events, and in understanding simple cause-and-effect relations. *pp.48-50 Language is a code for expressing ideas. *p. 71 Word order conveys meaning. *p. 72 Ideas can be expressed through speaking. *p. 64 The art of clear, pleasant, audible speech is developed gradually. *p. 66 Personal narratives follow a chronological order or a simple cause-effect relationship. *pp. 66-68 Informal modes of communication (e.g., conversation, discussion, creative dramatics) can lead to a sharing of ideas and thoughts. *p. 66 Questions generally require appropriate responses using full or part sentences. *p. 18 Social amenities (such as "please" and "thank you") are important.
READING AND LITERATURE	
PLEASURE AND INFORMATION	Literature gives pleasure. *p. 30 Literature improves self-understanding. *p. 52 Literature aids in understanding the behavior and values of others. *p. 52 Illustrations aid in understanding the literature. *p. 337

*Handbook for Language Arts: Pre-K, Kindergarten, Grades One and Two (Curriculum Bulletin, 1965-66 Series, No. 8)

** Sequential Levels of Reading Skills: Pre-Kindergarten--Grade 12 (Curriculum Bulletin, 1967-68 Series, No. 4)

Page references provide amplification or identify the source of the particular item and show related materials.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Stories	A story has a set structure with a beginning, a middle and an end. *p. 52 Real-life characters are different from "make-believe" characters. *p. 52 Stories are varied in type and include the following: folktales, Bible stories, animal stories, nature stories, and stories about people, places and things. *pp.378-79 Stories have different types of settings, varying in both location and time. *p. 52
WRITING	
CREATIVE AND FUNCTIONAL	Pupil-dictated stories or group stories express feelings and describe experiences. *p.70 Drawings and paintings express reactions to literature. *p. 70 Drawings and experiences are a base for learning oral and written phrases and sentences. *p. 70
WRITING CONVENTIONS	
Handwriting	Practice in handling tools and materials develops dexterity and control. *p. 70 Writing proceeds from left to right. *p. 70 Drawings and possessions are identified by writing one's name in manuscript form. *p. 70

COMMUNICATION ARTS GRADE 1

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Meaning is obtained through listening. *p. 77 Having a reason for listening aids in comprehension.*p. 78 Listening to simple directions develops a sense of order. *p. 90 Listening to stories develops skill in identifying main ideas and details and sequential order, and in recognizing implied ideas. *p. 86. Teachers' names and classmates' names are appropriate forms of address. *p. 126 Conversation is the spontaneous informal sharing of thoughts with the teacher and other pupils. *p. 126 Telling favorite or original stories or incidents provides opportunities for sharing ideas orally. *p. 128 Formal modes of communication (announcements, prepared statements, individual and committee reports) can lead to the sharing of thoughts and ideas.*p. 127 Ideas may be expressed in different sentence patterns. *p. 153 Intonation pattern is a clue to meaning; variations in voice show feeling and emotion. *p. 80 Asking questions is a way of communicating a need. *p. 126 Creative dramatics and puppetry stretch the imagination and help to interpret experiences. *p. 129 Oral reading by teacher and pupils demonstrates how phrasing, stress, pauses, and intonation affect meaning. *pp. 117-118 Choral speaking contributes to effective interpretation of poetry and the enjoyment of language. *p. 212 Voice production and enunciation require awareness and practice. *p. 80
READING AND LITERATURE	
PLEASURE AND INFORMATION	Literature is language at its best. *p. 91 Literature evokes many different emotional responses -- humor, grief, excitement, wonder, anger. *p. 92 Libraries are the depositories of many different kinds of information and literature to be found in books and other media. *p. 94

*Handbook for Language Arts: Pre-K, Kingergarten, Grades One and Two (Curriculum Bulletin, 1965-66 Series, No.8)
**Sequential Levels of Reading Skills: Pre-Kindergarten -- Grade 12 (Curriculum Bulletin, 1967-68 Series, No. 4)

Page references provide amplification or identify the source of the particular item and show related materials.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Stories	A plot unfolds through a series of episodes leading to a logical conclusion. *p. 380 Characters behave in ways which are believable. *p. 381
Biography	Stories are written about the lives of real people. *p. 380
Poetry	The enjoyment of poetry is extended through reading aloud and listening to others recite. *p. 372
Exposition	Factual materials give useful knowledge about the world.
PROCESSES Following skills generally applicable to content areas, as well as to literature	
Comprehension	
Literal	Details in a series of connected sentences may tell about the characters, setting, time, place or plot. **p. 24 Details relevant to the main idea of a selection can be found in illustrations, titles, and captions. **p. 6 The main idea of a selection may be expressed in one or more statements. **p. 6 Sequence is the chronological order of events in narratives **p.28
Inferential	An idea which is not directly stated must often be inferred **p.6
Critical	Some stories or poems may be more enjoyable than others to individual pupils. Stories may be real or make believe. **p. 6
Alphabet Knowledge	Each letter of the alphabet, both upper and lower case, has a name. **p. 8
Auditory Discrimination	Words have distinguishable sounds. **p. 5
Visual Discrimination	Words have distinguishable gross and fine differences. **p. 4

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Phonic Analysis	(For more detailed information on the various phonemes see the tables appended to this bulletin.) For each single consonant there is a sound-symbol relationship. Single vowel letters have short (unglided) and long (glided) sounds (phonemes). Some consonant letters may be combined with other consonant letters to form a consonant blend. Some words have similar combinations of letters and similar sounds (word families). New words can be formed by substituting new phonic elements for known elements.
Word Meaning	
Vocabulary Development	A limited number of words may be recognized by their shape (configuration) as sight words. **p. 8 Words which do not convey meaning (function words) can be recognized on sight, e.g., the, but, for. **p. 8 Words may have synonyms or antonyms. **p. 8
Contextual Clues	Word meaning may be obtained from the sense of the sentence and/or the surrounding sentences. **p. 22
Structural Analysis	A root word (free morpheme) is the base to which other words or word parts may be added. **p. 18 Words may have plural endings. **p. 16 Words may have inflected endings (s, ed, ing). **p.16 Compound words are formed by combining two root words each of which contributes to the meaning of the new word. **p. 16
WRITING	
EXPRESSIONAL AND FUNCTIONAL	Writing may record or express thoughts and needs. *p.131 Anecdotes and incidents based on individual and class experiences are the bases for written expression. *p.133

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
EXPRESSIONAL AND FUNCTIONAL	Ideas may be expressed in different sentence patterns. *p. 153 Practice in composing can be the result of cooperative and/or individual dictation. *p. 133
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	Word order may establish meaning. *p. 153
Punctuation	Every sentence begins with a capital letter and has a final punctuation mark. *p. 136
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. *p. 176 The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs.
Usage Developing communication is stressed, rather than correct usage.	Variations in usage patterns are acknowledged. *p. 155
Handwriting	Manuscript writing looks very much like print. *p. 160-175 Manuscript letters, composed of upper and lower case, require only two basic strokes; a circle or parts of a circle and straight lines. *p. 160

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	A variety of listening activities broadens the speaker's oral vocabulary. *p. 272 Listening develops skill in selecting main idea, comparing and contrasting details, recognizing sequential order and cause and effect relations. *pp. 189-194 Vocabulary growth enhances the ability to express ideas clearly and effectively. *p. 269 The language deemed appropriate at school may be different from the language of home and community. *p. 275 Discussion is the method by which ideas are expressed freely and attention is given to other points of view. *p. 232 Formal modes of communication (announcements, invitations, prepared statements, performed drama, individual and committee reports) can lead to the sharing of thoughts and ideas. *p. 236 Comparison and examples are used for clarification. *p.258 Oral reading requires understanding, phrasing, stress, clear enunciation, and dramatic quality. *p. 222
READING AND LITERATURE	
PLEASURE AND INFORMATION	Literature is read to broaden horizons and to gain insight into basic human values. *pp. 195-197 Literature develops critical thinking and imagination for deeper interpretation. Literature leads to greater knowledge of oneself. Literature leads to an understanding of other cultures. Literature read aloud increases pleasure and helps to interpret textual ideas. *pp. 222-223 Literature is the work of individual authors and illustrators. *p. 196
Stories	
Folk Tales	Each separate culture has its lore of tales transmitted over a long period of time. *p. 378

*Handbook for Language Arts: Pre-K, Kindergarten, Grades One and Two (Curriculum Bulletin, 1965-66 Series, No.8)
**Sequential Levels of Reading Skills: Pre-Kindergarten--Grade 12 (Curriculum Bulletin, 1967-68 Series, No. 4)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Fairy Tales	Fairy tales are folk tales that describe beings with magical powers: fairies, giants, trolls. *p. 378
Animal Stories	Animal stories frequently employ animals who have human characteristics and often show us how to behave. *p. 379
Biography	Biographies relate the lives of real people. *p. 380
Poetry	Poems use words creatively and have a singing quality. *p. 372 Poems offer vivid descriptions of nature and human feelings.
Exposition	Factual materials give useful knowledge about the world.
PROCESSES Following skills generally applicable to content areas, as well as to literature	
Comprehension	
Literal	Details may express similarities and differences. **p.27 Titles generally relate to the main idea or subject of a selection. **p.24 The sequence of events of a reading selection may follow a logical order. **p. 28 Cause and effect relation may be clearly stated. **p. 6 The main idea of a selection may appear in various positions in a selection. **p. 24
Inferential	The main idea of a selection may be inferred from the cumulative details of that selection. **p. 30 A series of events may be predicted by reviewing sequence and cause-effect relations. **p. 6 Conclusions concerning actions, characters, outcomes, themes, and plot development may be drawn from logical inferences. **p.6

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Critical	Selections may express authors' opinions or statement of fact. **p. 34
Word Meaning	
Vocabulary Development	Content area materials are source for expanding sight vocabulary. **p.8 Homonyms are words that have the same sound but are spelled differently and have different meanings.
Contextual Clues	Words may have multiple meanings. **p. 22 Content area words are added to vocabulary study.**p. 9
Structural Analysis	An apostrophe may be used to show possession.**p. 16 A contraction is a short way of writing two words.**p. 18 An apostrophe is used to show the omission of one or more letters.**p. 16 Some inflectional endings (s, ed) may vary in sound. **p. 16
Alphabet Knowledge	The letters of the alphabet are arranged in sequence.
Phonic Analysis	(For more detailed information on the various phonemes see the tables appended to this bulletin.) For each single consonant letter there is a corresponding phoneme (sound) relationship in the initial and final position. Some consonant letters are combined to form a single sound referred to as a consonant digraph. The consonant letters r, w, and l affect the sound of immediately precedent vowels. The consonant letters c and g have both a hard and soft sound. The letter y and the endings ed and d have more than one sound. Some consonant letters and consonant blends have variant sounds (voiced and unvoiced.) Some consonant letter combinations have silent letters. Some vowel letters are placed together to represent a single sound called a digraph. Some vowel letters are placed together to blend their sounds into a new sound called a diphthong.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE	26
WRITING	There are two main types of writing: expressional and functional.	
EXPRESSIONAL AND FUNCTIONAL	Expressional writing conveys one's thoughts, ideas, and feelings. *p. 240 Functional writing includes factual writing: simple letters, reports, messages. *pp. 263-6 Writing letters is a method of sending a personal communication to others. *p. 263	
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills		
Sentence Sense	A sentence is a group of words belonging together. *pp. 273-5 Some sentences make statements; others ask questions. *p. 273	
Usage	The past tense of regular verbs ends in ed, but many common verbs (see, go, buy, do, take) have irregular endings. *p. 276 Sentences begin with capital letters and end with periods or question marks. *pp. 242-246 Exclamations end with exclamation points. The pause in speaking corresponds to punctuation marks.*p.273	
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. *pp.289-290 The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs.	
Handwriting	Manuscript writing becomes more precise and smaller in size. *p. 287	

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Listening to stories develops skill in identifying main ideas and details, sequential order, understanding cause and effect relations, and drawing conclusions and predicting outcomes. *p. 20-23 Hearing may be passive and involuntary; listening is a voluntary activity. *p. 23 Language is spoken on two levels of usage -- formal and informal. Each is appropriate to a given situation. *pp. 138-139 An interview with another person is a way of obtaining information. *p. 97 Oral reading with expression enhances enjoyment and comprehension. *pp. 79-80 Choral speaking contributes toward effective interpretation of poetry and the enjoyment of language. *p. 258 Original stories are based on experiences or imagination. *p. 103 A report is tied closely to a center of individual or group interest or curriculum area. *p. 99
READING AND LITERATURE	
PLEASURE AND INFORMATION	Literature exists in print and other media. *p. 39 Literature exists in varying lengths and is often read in segments. *pp. 39-41 Literature is created in different genres, each having identifying characteristics, e.g., short story, novel, biography, drama, and poetry. *pp. 39-40 Individual authors may have written many books with similar ideas and/or locale and characters. *pp. 39-41
Stories	In addition to plot and character, stories have settings which express time-when and place-where. *p. 348
Poetry	The meaning of poetry is enhanced by an awareness of cadence, beat, and figurative language. *p. 52

*Handbook for Language Arts: Grades Three and Four (Curriculum Bulletin, 1969-70 Series, No.6)
**Sequential Levels of Reading Skills: Pre-Kindergarten--Grade 12 (Curriculum Bulletin, 1967-68 Series, No. 4)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Alphabet Knowledge	Letters of the alphabet have both a manuscript and cursive form. **p. 8
Phonic Analysis	(For detailed information on the various phonemes see the tables appended to this bulletin.)
WRITING	
CREATIVE AND FUNCTIONAL	Careful observation of objects, places, people forms the basis for good writing. *p. 110 The realm of the child's private and fantasy world may become the subject for prose and poetry. Factual writing is necessary to provide records. *p. 105 Logical development of ideas enables one to think and write clearly. *p.104 Good writing requires revision. *p. 299
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	A simple sentence is a group of words belonging together and conveying meaning. *p. 135
Usage	The subject of a sentence agrees with the predicate. *p. 140
Punctuation	Basic marks of punctuation: the comma, period, question mark, and exclamation point, bring more clarity to the written word. *pp. 134-135

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Exposition	Factual materials give useful knowledge about the world.
PROCESSES Following skills generally applicable to content areas, as well as to literature	
Comprehension	
Literal	Stated details in content area materials may be isolated as sub-headings in chapters or parts of chapters.**p. 27 The main idea of a selection may be directly stated in various locations within the selection. ** p.24 Clue words such as first, next, and last indicate sequential order of events. ** p.28 Clue words such as because and as signal cause and effect relations. ** p.29
Inferential	Cause and effect relations not directly stated may be determined. ** p.31 Sequential order is a factor in predicting outcomes and drawing conclusions. ** p.28
Critical	Experiential background and knowledge affect evaluation of written materials. ** p.34
Word Meaning	
Vocabulary Development	Vocabulary also expands through including content area words. ** p.9
Contextual Clues	Word meaning may be found from the context in a direct statement, through a synonym or through apposition. ** p.22
Structural Analysis	A prefix comes before a root word and changes the meaning of the word. ** p.18 A suffix comes at the end of a root word and changes the meaning of the word. ** p.18 Comparatives and superlatives change the meanings of adjectives, (er, est, more, most). ** P.18

Spelling

Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences.*p.162
The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs.
Words may be spelled according to a common structural element.
Regular plurals are formed by adding s.*p. 334
Regularly inflected verbs add s, ing, and ed. *p. 336
Words ending in silent e drop the e before adding ed and ing.
An apostrophe shows the omission of a letter or letters in a contraction. *p. 335

Handwriting

Letters of the alphabet have both upper and lower case in manuscript and cursive forms. *p. 155

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Listening to various forms of communications reinforces comprehension. Role-playing serves a variety of functions: understanding language and situations, expressing feelings, and illustrating ideas. *p. 264 Telephone conversation has specific conventions of answering: identification, clear message-giving, and brevity *251 Reporting involves the use of an inviting opening sentence vivid details and examples, organization, and clear delivery, and may be made by individuals or groups. *254 Memorization and recitation of poetry stimulate enjoyment and sensitivity to language and its patterns. *p.210-221
READING AND LITERATURE	
PLEASURE AND INFORMATION	
Novels	Well-developed characterization depends on the degree to which characters are true to life. *p. 348 Historical fiction deals with historical events and real or fictional characters. *p.345
Biography	Biographies may provide insights into the historical period *347
Poetry	In poetry the poet varies the sequence for emphasis. *p. 350 Poetry makes wide use of comparisons (metaphors and similes) *p.350 Poetry uses repetition of sounds (assonance, alliteration, rhyme). *p. 350 Poetry employs words where the meaning is suggested by the sound (onomatopeia). *p. 350 Free verse is poetry without regular rhyme or meter. *p. 351 A popular form of unrhymed poetry is Japanese Haiku, a poem of seventeen syllables divided into three lines of five, seven, and five syllables. *p.294

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Exposition	Factual materials give useful knowledge about the world.
PROCESSES Following skills generally applicable to content areas as well as to literature	
Comprehension	
Literal	Details may be used to support a point. **p. 26
Inferential	Details may be inferred from the context. **p. 31 Characters can be analyzed by their actions. **p. 30 Outcomes may be predicted based upon stated fact. **p. 30
Critical	Personal experiences may be related to a narrative or expository selection. **p. 34 Fact and opinion may be distinguished based upon clue words such as in my opinion and I believe that. **p. 34
Word Meaning	
Vocabulary Development	Vocabulary also expands through including content area words *9 Words evoke emotional and sensory responses. **p. 9
Contextual Clues	Word meaning may be found contextually through comparison and/or contrast. **p. 22
Structural Analysis	Words of more than one syllable can be divided between the syllables. **p. 20
Phonic Analysis Should have been completed by this grade except for individual students who need reinforcement	(For detailed information on the various phonemes see the tables appended to this bulletin.)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
WRITING	
CREATIVE AND FUNCTIONAL	A paragraph is a set of sentences of related ideas. In expository paragraphs there are generally a main idea (implied or stated) and supporting ideas. *p.272 An opening sentence is important in introducing the subject and arousing the reader's interest. *p. 273 Writing stories or reporting an event makes use of chronological order. *p. 274 Factual writing involves organizing and writing records, signs, labels, forms, directions, notes, reports. *pp. 269-70,80 First hand and vicarious experiences provide the material for journals, letters, and anecdotes. *pp. 272-3 Tales of fantasy, myths, fables or dreams may be the models for imaginative writing. Revision is a means of improving one's original writing. *pp. 299-301
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	Simple sentences may be expanded to form compound sentences joined with and or but. *p. 306
Punctuation	A comma is usually needed before and or but when used to join compound sentences. *p. 306
Usage	To improve style, pronouns may be substituted for nouns. *p.341 A pronoun agrees with its antecedent in number and gender.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE	34
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. *p. 368 The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs. Some plurals are formed by adding s, es, changing y to i and adding es. *p. 327 Some word roots change when plurals are formed (irregular plurals such as foot, feet). A word ending in a single consonant following a single vowel doubles the consonant for an inflectional ending (run, running). *p. 229 A word of more than one syllable can be divided between its syllables. *p. 324 Common abbreviations exist for days, months, titles, and measurements.	
Handwriting	Cursive writing is the conventional form of script in which letters are joined and words separated. *pp. 316-20	

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Listening is a means of appreciating the mood of a selection***12 Listening critically is a means of evaluating content of written materials. ***p. 11 Listening to various forms of written communications reinforces comprehension. ***p. 155 Effective discussion has purpose, direction, and opportunities for participation by all. ***p. 17 Volume, pitch, rate, and quality of voice are appropriately varied to occasion. ***p. 7 There are standards for pronunciation and articulation suitable for different occasions. ***p. 8 Choral speaking contributes toward effective interpretation of poetry and the enjoyment of language.
READING AND LITERATURE	
PLEASURE AND INFORMATION	Common emotions and aspirations unite all people. *p. 224 Cultural differences exist among people; these should be understood and respected. *p. 155
Novel, Short Story, Myths	The plot may develop in a straightforward chronological manner. *p. 241 The hero and the villain of the piece of literature are identified by their characteristics. *p. 241 The setting (time and place) of the story is important in its relation to the story. *p. 241 Characters' traits and actions may be evaluated in terms of ethical values relating to the students' own lives.*p.222 Characters' strengths and weaknesses may cause them to overcome or succumb to obstacles. The motivation for characters' behavior must be sought in terms of environment, personality, and society. *p. 223 The myths of all countries relate their histories, customs, and beliefs. *p. 309

Page references provide amplification or identify the source of a particular item and show related materials.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Drama	A play contains dialogue to interpret character and develop the components of plot. *p. 310
Biography	Biographies and autobiographies give insights into the subjects' lives and personalities, and may serve as role models. *p. 261
Poetry	Poetry employs words with musical quality. *p. 242 Onomatopoeia (sound of a word suggesting meaning) and alliteration (repetition of initial sounds) enhance the meaning and musical qualities of poetry. *p. 252
Newspapers, Journals, Speeches	Personal accounts supply authentic flavor.
PROCESSES	
Following skills generally applicable to content areas, as well as to literature	
Comprehension	
Literal	Knowledge of literal meaning is applied to increasingly more difficult content and concepts. **p.25
Inferential	The literal meaning of a sentence can be expanded to include an extended meaning. **p. 31 Related ideas may be used to make generalizations. **p. 31 Outcomes may be predicted based upon facts not directly stated. **p. 30
Critical	Recognition of an author's purpose aids comprehension and evaluation. **p. 35
	(Generally, these skills are integrated with reading for pleasure and information).

*Sequential Levels of Reading Skills: Pre-Kindergarten--Grade 12 (Curriculum Bulletin, 1967-68 Series, No. 41)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Word Meaning	
Vocabulary Development	Vocabulary also expands through including content area words **p.9 Language is constantly growing and changing. **p. 9 Many words have a specific history that can be traced back to their origins. **p. 9 New words are invented for new discoveries, ideas, and/or situations. **p. 9
Contextual Clues	Context aids in understanding words in technical and literary material. **p. 23
Structural Analysis	Dividing words into syllables may aid in decoding unfamilar words. **p. 21
WRITING	
CREATIVE AND FUNCTIONAL	Appropriately selected words provide clarity, vividness, and precision in context. ***p. 171 Variety in the use of language makes writing more interesting. Varied sentence types provide interest and fluency. ***p.172 The paragraph contains an orderly and unified presentation of thought. ***p. 173 The basic paragraph requires writing of a moderate length. Paragraphs may be descriptive, narrative, persuasive or expository. Individual statements on a topic must be related to each other. ***p. 173
Forms	The personal letter form includes the date, salutation, closing, and signature. ***p. 173 The envelope shows the complete return address and full name and address (including zip code) of the recipient.***173

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	There are different kinds of sentences: statements, questions, commands or requests, and exclamations. ***p. 172 Simple sentences can be joined by using such coordinating linking words as and, but and or.
Usage	Comparatives and superlatives of regular adjectives are formed by adding er and est. ****p. 15 Auxiliary verbs aid in forming tenses.
Punctuation	The sentence is to be distinguished from word groups and fragments and is punctuated by an initial capital letter and a final period, question mark, or exclamation point.****17 The hyphen is used to separate parts of a word at the end of a line. The apostrophe is used to show possession. ****p. 268
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. *p.215 The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs. There are certain words which have a regular spelling pattern.****205 Certain types of spelling errors persist because of reversals, omission of silent letters, mispronunciation, lack of emphasis on final sound. ****p.209

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Listening to various communications reinforces comprehension. Listening critically is a means of evaluating content. ***p.23 Listening for essential points will help in focusing on directions. ***p. 44 When speaking, the intonation and rising and falling of the voice have a definite pattern. ***p. 19 Short talks before a live audience help to build poise and confidence. ***p. 25 Improvising scenes from a play gives insight into character and motivation. ***p. 51 Performing a role in a play demands skills such as pantomime, body action, and appropriate voice modulation and effect. Dialect and standard structures are compared and understood. ***p. 28
READING AND LITERATURE	
PLEASURE AND INFORMATION	
Short Story, Novel, Drama	The elements of plot can be identified. *p. 241 Characters in books may reflect the effects of their good or bad environment. *p. 222 Characters in books help us to know ourselves and others more accurately, develop a set of personal values, make judgments independently, and take action accordingly. *p.250
Poetry	The emotional impact of poetry is heightened by the type of rhythm employed. *p. 254 The rhyme scheme follows a regular or irregular pattern. *p257 The lines of a poem may follow a regular stanza form such as the couplet or quatrain. *p. 258 Poetry is made more vivid through the frequent use of simile and metaphor. *p. 242 The choice of words and the sounds of the lines convey mood.*259

Handbook for English Language Arts: Grades 5--12
*Reading and Literature (Curriculum Bulletin, 1967-68 Series, No.10)
***Speech and Composition (Curriculum Bulletin, 1969-70 Series, No.21)
****Language Strand (Curriculum Bulletin, 1974-75 Series, No. 4)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Essay	The personal essay may express the author's sense of humor, way of thinking, or preferences. *p. 244
Newspapers, Journals, Speeches	Good reporting has authenticity and objectivity.
PROCESSES	
Following skills generally applicable to content areas, as well as to literature	
Comprehension	
Literal	Knowledge of literal meaning is applied to more difficult content and concepts. **p. 25
Inferential	Sequential order may be inferred using logical reasoning and by placing details in their order of occurrence. **p. 29 Conclusions are drawn as a result of inductive and/or deductive reasoning applied to a paragraph or selection. **p.30 Recognition of cause and effect relationships serves as an aid in drawing conclusions and predicting outcomes. **p.31
Critical	Recognition of an author's point of view aids in understanding a selection. ** p.35 Materials can be evaluated for validity and accuracy. **p.35 (Generally these skills are integrated with reading for pleasure and information).
Word Meaning	
Vocabulary Development	Many English words are derivatives of other languages. ***p.174 **p. 9
Contextual Clues	Punctuation may provide clues to word meaning, e.g., dash, parentheses, commas. **p. 23 Context clues aid in understanding words in technical and literary material. ** p. 23

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Structural Analysis	Identifying parts of a word can aid in defining the word.**p. 21
WRITING	
CREATIVE AND FUNCTIONAL	Writing may be enriched by searching for vivid and precise words, using synonyms, antonyms, descriptive words and action words. ***p. 174 Words may have interesting historical backgrounds which give them special connotative value. ***p. 174 A narrative paragraph creates a sense of unity by telling of a single significant piece of action. ***p. 176 The descriptive paragraph achieves sensory effects through effective and selective words. ***p. 176 The simple expository paragraph of the "how-to-do" or "how to make" variety uses sequential order. ***p. 176 Letters to friends and family are an excellent way to communicate personal feelings and experience. ***p. 177
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	Sentence kernels (basic sentences - simple subject and predicate) can be joined by using such subordinating linking words as when, as, since, although, and because. There are basic sentence patterns, among them: S-V (Subject - Verb) S-V-O (Subject - Verb - Object) ****p. 18

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Usage	Don't and doesn't agree with their subjects. The double negative construction, in which two negative words are used when one is sufficient, is considered non-standard form.
Punctuation	Use capitals for proper names, initials and abbreviations, and first word in salutation and closing of a letter. A comma is used before and, but, or, nor, for, yet when they join simple sentences. Capital letters are used for titles with a person's name, key words in titles of books, films, stories, poems. Commas are used for words in a series.
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. *p.206 The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs. Certain spelling errors persist because of confusion of homonyms, omission of silent letters, failure to double consonants, incorrect vowels, addition of letters.****209
Proofreading	Proofreading is a complex skill that involves the recognition of errors and the ability to correct them.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Listening to various forms of communication reinforces comprehension. Good voice production includes respiration, phonation, resonance, and articulation. ***p. 31 Accents may affect the pronunciation and meaning of words. Parliamentary procedure is an effective method of conducting a meeting involving set rules of order, voting, elections, and related activities and procedures. ***p. 40
LITERATURE AND READING	
PLEASURE AND INFORMATION	The understanding of literature is a help in understanding oneself. *pp.224-5 Personal values are clarified and strengthened by the wide reading of literature. *pp. 224-5 Responsibility to the family unit is developed and reinforced by the study of literature. *p. 227 Pathos, irony, and wit are elements which give emotional effect. *p.248 Figurative language is used to highlight literal meanings. *p.254 Propaganda can be recognized. *p. 100
Mythology	Mythological deities, folk heroes, and characters in stories and fables possess qualities which mirror human attributes, virtues, and frailties. *p. 309
Short Story, Novel	Stories and novels may be told through the eyes of the author (third person) or by a character in the story (first person). *p. 94 The subplot is a method of enriching and supplying contrast to the main plot. *pp. 245-6 The use of flashback is a method of plot development. *p. 245

Handbook for English Language Arts: Grades 5--12
*Reading and Literature (Curriculum Bulletin, 1967-68 Series, No.10)
***Speech and Composition (Curriculum Bulletin, 1969-70 Series, No.21)
****Language Strand (Curriculum Bulletin, 1974-75 Series, No. 4)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Poetry	Different speech sounds such as sibilants and plosives contribute to the overall effect of a poem. *p. 242 The rhyme may be organized in regular patterns: a-a, b-b, c-c, etc.; ab-ab; and the like. *pp. 254-7 Personification is a figure of speech in which human attributes are given to inanimate things or animals.
Biography	The author of a biography may present a personal or biased point of view about the subject. *pp.224-228
Essay, Articles	The story essay is a form often used to present a moral. *p.244 Informed opinion is the personal opinion of an expert in the field. Objective reporting is factually oriented, complete, and avoids slanted words, propaganda, and a personal point of view
PROCESSES	All the basic processes and skills of reading have been covered by the end of grade 6 for students on grade level. For students in grades 7, 8, and 9, advanced reading skills are best integrated into the teaching of literature and content area materials. This section is now referred to as Literature and Reading. For students reading below grade level, remediation should be planned for those skills in which students are deficient.
WRITING	
EXPRESSIONAL AND FUNCTIONAL	Words have an emotive force. ***p. 178 Modifiers are placed as close as possible to the words they modify, to enhance clarity. New words -- some slang, some specially created -- keep language current and colorful.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	In an expository paragraph the most important points come first, followed by the less important in rank order or vice versa. ***p. 179 Persuasive paragraphs may use some or all of the following: fact, opinion, authority, evidence.
Forms	The business letter form may be block or indented, containing the sender's address, the inside address, date, proper salutation, and closing. ***p. 180 Business letters should be clear, concise, and courteous. Persuasive letters should use the above devices and should avoid name-calling and abusive language.
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	Effective sentences can include phrases and clauses. ***p. 178 There are basic sentence patterns, among them: S-V-IO-O (Subject - Verb - Indirect Object - Object). Subject and predicate agree in number and person.
Punctuation	Indentation marks the start of a new paragraph. Quotation marks are used to indicate direct speech.
Usage	Parts of speech are identified by their position and form: noun, verb, adjective, adverb, pronoun, determiner. ****p.33 Adverbs ending in ly and adjectives of more than two syllables are preceded by more and most in the comparative and superlative. ****p. 39
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Listening to various forms of communication reinforces comprehension. Informal and formal debating provides a forum for the exchange of ideas and opinions. ***p. 52 Regional variations may alter the pronunciation and meanings of words. ***p. 129 Meaning can change the pronunciation of some words, e.g., ob'-ject, ob - ject'; rec' - ord, re - cord'.
LITERATURE AND READING	
PLEASURE AND INFORMATION	Personal attitudes and values are clarified through the study of literature of enduring value. *p.88 The process of maturing is aided by understanding characters and situations in literature. *pp.226-7 Responsibility to other members of society is developed through a careful reading of good literature. *p.156 An author often presents a thesis or statement which is called a theme. *pp. 56-7 Meaning may be inferred when a writer uses ellipsis (the omission of a word or words from a sentence). The omission of information is a technique which may be used to create a biased report. ***p. 92
Short Story, Novel, Drama	Variations in time sequence in plot development (such as beginning in the middle of the action) have an impact. *p.245 Foreshadowing is a technique to give psychological and artistic emphasis and to build suspense. *p. 246 Characters are revealed through the use of first-person narrative. *p. 249

Handbook for English Language Arts: Grades 5-12
*Reading and Literature (Curriculum Bulletin, 1967-78 Series, No. 10)
***Speech and Composition (Curriculum Bulletin, 1969-70 Series, No. 21)
****Language Strand (Curriculum Bulletin, 1974-75 Series, No. 4)

Page references provide amplification or identify the source of the particular item and show related materials.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Poetry	The associative values of words enrich poetry. *p. 242 Hyperbole (exaggeration) is a figure of speech which heightens effects in poetry. *p.255 A symbol (generally a material object used to represent something often immaterial) is frequently used for effect in poetry. *p. 260
Autobiography	The authors of autobiographies have both advantages and disadvantages in approaching their own lives. *p. 261
Essay	The character sketch is a form of essay frequently found in books and in journals. *p. 265
Newspapers	A simple news story is structured according to the Five W's. ***p. 48
PROCESSES	All the basic skills of reading have been covered by the end of grade 6 for students on grade level. For students in grades 7, 8 and 9, advanced reading skills are best integrated into the teaching of literature and content area materials. For students reading below grade level, remediation should be planned for those skills in which students are deficient.
WRITING	
EXPRESSIONAL AND FUNCTIONAL	Brevity and succinctness are vital to the clear statement of ideas. ***p. 181 Words and names may convey positive or disparaging meanings. Variety in sentence beginnings through the use of infinitives and phrases provides smoothness and interest. Expository paragraphs may be developed through logical use of detail and example. ***p. 182 Longer compositions may be composed of paragraphs stressing introduction, body, and conclusion. ***p. 183

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
EXPRESSIONAL AND FUNCTIONAL	The appropriate tone for different types of business letters may be courteous, firm, insistent, and always succinct. ***p. 183 Fan letters should reflect honesty of reaction and good taste. *** p. 183
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	Clauses beginning with subordinating words (such as if, where, while) are used to present ideas subordinate to the main idea. ****p. 20 Recognizing and using parallel structure within the sentence and the paragraph creates more cohesive writing. ****p. 36 The basic sentence patterns may be expanded by modification and coordination. ****p. 14 There are basic sentence patterns, among them: S-LV-ADV (Subject - Linking Verb - Adverb).
Punctuation	Introductory phrases and subordinate clauses are followed by commas. Direct quotes can be broken and continued after the name of the speaker has been inserted.
Usage	A regular verb forms the past participle by placing an auxiliary verb before the past tense form. Irregular verbs are formed differently. Conjunctions, prepositions and interjections are identified by their functions.
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs. The addition of affixes and/or inflected endings to a root word may alter the basic spelling of the word.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LISTENING AND SPEAKING	Critical listening aids in discerning bias, propaganda, slant.*** p.70 The formal speech is used to give information, report, or air an opinion. (Notes may be used.) ***p. 58
LITERATURE AND READING	
PLEASURE AND INFORMATION	Family and social traditions provide continuity but might be reexamined in the light of new information. *p. 230 Although the individual is a member of society, individuals cannot abrogate responsibilities for their own ethical judgment and action. *p. 230 Typographical clues may serve as a clue to word meaning, e.g., boldface, italics, quotation marks, commas and parentheses, setting off appositives. *pp. 84-5 The meaning of words and figures of speech may depend upon their literary or historical heritage. *p. 84 Propaganda techniques based upon slanted writing and emotional appeal are recognized. *p. 87
Short Story, Novel, Drama	The plot of a short story, drama and novel may follow the pattern of: rising action, climax, falling action, resolution, denouement. *p. 247 The plot may not necessarily develop according to regular pattern but may shift back and forth. *p. 245 Character development may be evaluated by standards of credibility and consistency. *p. 250 Settings may be single or multiple and shift from one place to another. *p. 250
Poetry	Irony is the figure of speech which expresses a meaning opposite to the intended meaning. *p. 242 A line of poetry may be divided into measures called feet with a regular pattern of stressed and unstressed beats. *p. 242
Biography and Essay	The biography and essay may be used to present the author's point of view. *p. 262

Handbook for English Language Arts: Grades 5-12
*Reading and Literature (Curriculum Bulletin, 1967-78 Series, No. 10)
***Speech and Composition (Curriculum Bulletin, 1969-70 Series, No. 21)
****Language Strand (Curriculum Bulletin, 1974-75 Series, No. 4)

Page references provide amplification or identify the source of the particular item and show related materials.

1
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Newspaper	An editorial expresses the opinion of the editor. The review is an informed opinion on the arts.
PROCESSES	All the basic skills of reading have been covered by the students on grade level. For students reading below grade level, remediation should be planned.
WRITING	
EXPRESSIONAL AND FUNCTIONAL	Science, the arts, and industry have contributed many specialized words to the language. ****p. 176 Slang consists primarily of figurative language which may have transient popularity or become part of the language.****93 Details in the descriptive paragraph may be arranged according to spatial order. ***p. 186 Expository paragraphs may be developed through the use of comparisons and contrasts. ***p. 186 Persuasive paragraphs should have a point of view, a logical development, and employ effective language. ***p. 186 Dialogue, appropriately punctuated, lends reality to narrative writing. ***p. 187 Letters of application should contain relevant information and appropriate tone. ***p. 186 Letters of persuasion to public officials and the press should be forceful, courteous, and pertinent. ***p. 186
Journalism	The news article should contain a lead sentence with the 5 W's and paragraphs of descending order of importance. The editorial is a statement of opinion. The human interest story is an incident usually of local interest, with emotional or humorous appeal.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
WRITING CONVENTIONS Taught as needed in actual writing, NOT as isolated skills	
Sentence Sense	There are basic sentence patterns, among them: S - LV - PA (Subject - Linking Verb - Predicate Adjective); S - LV - PN (Subject - Linking Verb - Predicate Nominative). Variety in sentence beginnings through the use of infinitives and phrases provides smoothness and interest. ****p. 16-17
Punctuation	Appositives and other parenthetical elements provide additional information and are set off by commas.****p. 21
Usage	A verb is active when it expresses an action performed by its subject. A verb is passive when it expresses an action performed upon its subject. Active verbs are generally stronger than passive verbs. A compound subject joined by and requires a plural verb. ****p. 38
Spelling	Spelling Words List C comprises words most frequently used in student writing for that grade; new words are added from reading, content areas, and experiences. The list is further supplemented by each student's individual bank of spelling words based on reading and writing needs.

Health Education
Grades
5-6-8

Overview.....55

Grade 5.....56

Grade 6.....59

Grade 8.....62

HEALTH EDUCATION

With our increased attention to the current health issues of nutrition, environmental stress, drug and alcohol abuse, overpopulation, and the inequality of health care, the concern for the health of our children is perhaps greater today than ever before.

Health education of the school-age child supplements and reinforces efforts at home and in the community. This education for health represents a major challenge to our society. While the causes of many of today's health problems are known, and to a great extent preventable, we nevertheless find that children are unwilling or unable to make the proper choices for better health.

The emphasis in health education, therefore, must be in helping the pupil-learner make informed decisions about his or her health behavior. To be successful in this regard, children should be personally involved in defining their own goals and actions, while guided by parents and teachers toward evolving an acceptable means for achieving positive health behavior within their own framework of values, beliefs, and resources.

Such changes in behavior, to be long-lasting and practiced regularly, must be a personal decision. While there are many factors that enter into the decision-making process, our primary responsibility is in providing children with a body of knowledge as a starting point. The information contained in this publication is intended to assist in this learning process. Though it provides the basic health learnings for the district schools, it should be noted that other curriculum resources are available to help the classroom teacher in planning creative approaches to the health instructional program.

Health education can have a significant role in the school curriculum if recognized as an important means for achieving general human understanding and improving the quality of life. With support from the school and community, these worthy goals can be realized.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
CLEANLINESS AND HEALTH PROTECTION *pp. 168-171	The skin provides a first line of defense against disease and infection. A daily bath serves to wash away harmful germs that gather on the skin. Frequent, regular brushing and washing of the hair helps to prevent conditions such as dandruff, dry scalp, and pediculosis (head lice). It is important for hands to be washed after using the toilet and before handling or eating any food. Protection against infection is reinforced when people are careful not to share towels, combs, brushes, and other personal toiletries.
NUTRITION *pp. 171-173	Many parts of the body assist in the digestion of food. Daily practices should be established to promote good digestion, such as eating in pleasant surroundings and in a leisurely fashion, and eating meals at regular times.
DENTAL HEALTH *pp. 174-176	A tooth is constructed of three main parts: the crown, neck, and the root. The tooth is composed of three types of living tissue: the enamel, dentine, and pulp.
MENTAL HEALTH *pp. 176-181 Also see FAMILY LIVING INCLUDING SEX EDUCATION	Personality development depends upon heredity, environment, and experiences. An individual's attitude toward self, family, friends, and school has an important influence on personality.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
MENTAL HEALTH (continued)	A positive attitude toward family, friends, school, and community should result in the acceptance and sharing of responsibility. There are specific personality traits which family and friends find acceptable. In order to carry out responsibilities one must learn to budget time for work and play.
EYES AND THEIR CARE *pp. 181-184	Specific body structures and functions serve to protect the eye. The human eye is very similar to a camera. There are three kinds of specialists concerned with the care of the eyes: ophthalmologist, optometrist, and optician. It is important to wear and care for eyeglasses for the improvement of one's vision.
SAFETY AND FIRST AID *pp. 184-190	Accidents are the leading cause of death in the school-age population. Most accidents can be prevented through the development of good safety habits. Many children are hurt as pedestrians and bicycle riders; this can be prevented by following specific safety rules. Wearing the proper clothing for games contributes to safe living. Safety rules should be followed at swimming pools and beaches. First aid means helping someone who is hurt or suddenly ill. This is the kind of help that you give before medical assistance arrives.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
EXERCISE, REST, AND SLEEP *pp. 190-194	Exercise can be obtained in various ways, depending on one's interests. Good health and safety habits make exercise more enjoyable and more valuable for the individual. Rest can be obtained in various ways. One should plan for his or her own exercise and rest. Sleep is important to good health.
ALCOHOL, TOBACCO, AND DRUGS *pp. 194-198	Alcoholic beverages are derived from the fermentation of sugar and yeast. Alcohol is often used on religious and social occasions. Excessive drinking may result in nutritional deficiencies. There are many factors which motivate children to smoke cigarettes. There are also many good reasons why one should not smoke. Tobacco disturbs the normal functions of the body's systems. Marijuana is an illegal drug. Its effects may be harmful.
HUMAN GROWTH AND DEVELOPMENT *pp. 199-200 Also see FAMILY LIVING INCLUDING SEX EDUCATION	Individuals vary in their rates of growth. The onset of puberty varies with individuals. Girls usually reach puberty sooner than boys. The endocrine glands play an important role in pubertal changes. Menstruation is a normal and natural physiological function. Proper hygienic habits during menstruation are important.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
NUTRITION *pp. 206-211	Food is used by the body for growth, repair of damaged cells, and the maintenance of body efficiency. Nutrients are substances in food used to nourish the body. The "Basic Four" food groups make it easy to plan a balanced diet. Care should be taken in the preparation and preservation of food.
CLEANLINESS AND HEALTH PROTECTION *pp. 201-206	People who live in communities are always faced with the threat of communicable diseases. The community undertakes measures to prevent disease through a program of education, inspection, and disease control. Building codes are established to safeguard health by establishing regulations for toilet facilities, plumbing, and sewage disposal. The Environmental Protection Agency maintains a continuous program of education and analysis in order to control air and water pollution. Good health is everyone's responsibility; resistance to communicable disease can be developed in many ways. Eating well-balanced meals helps to keep us healthy.
DENTAL HEALTH *pp. 211-214	Caries (cavities) of the teeth are caused by bacteria. Tooth decay and gum damage can be minimized or prevented by proper dental care. Cleaning the teeth carefully helps reduce cavities and gum disease. Using dental floss cleans food from between the teeth. Visiting a dentist regularly is a valuable health practice.
MENTAL HEALTH *pp. 215-219 Also see FAMILY LIVING INCLUDING SEX EDUCATION	Children and parents strive continuously to develop a harmonious family unit. As children mature they need to make and keep friendships. This involves certain responsibilities. It is important to learn how to handle both success and failure.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
SAFETY AND FIRST AID *pp. 222-230	Automobile passengers sometimes contribute to accidents by distracting the driver. First aid is defined as the immediate and temporary care given to a victim before the doctor arrives. It is important to be able to recognize and treat traumatic shock. One should be able to recognize a possible fracture and administer the proper first aid. Artificial respiration is needed when a victim has stopped breathing. A victim having a severe epileptic seizure may be helped by proper first aid. Many children are injured or die from poisoning each year. Preventive measures and proper first aid can reduce the number and severity of these accidents. Many people, particularly middle-aged and older persons, are subject to heart attacks. The first aider can be helpful if the proper action is taken.
EXERCISE, REST, AND SLEEP *pp. 232-236	A healthy, physically fit person gets the most out of life. A person can achieve and maintain a high level of health and fitness if he or she participates in a program of daily vigorous activity. By learning lifetime sports skills such as golf, tennis, and bowling early in life, a child is preparing for the continuation of fitness activity during the adult years. Maximum fitness is achieved and maintained when regular, vigorous activity is balanced by an adequate amount of rest.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
ALCOHOL, TOBACCO, DRUGS, AND SUBSTANCE ABUSE *pp. 236-241	Excessive drinking interferes with one's judgment and coordination. All people do not react to alcohol in the same way. Alcoholics and their families can obtain help from a number of organizations such as Alcoholics Anonymous and Al-Anon. Young people begin to drink socially for many reasons. Nicotine has various harmful effects or health. Smoking is a difficult habit to break. Under some conditions, marijuana use can become so unpleasant that panic results. For some people, marijuana can be harmful. Barbiturates are depressants which users take because of their intoxicating and sedating effects. Abuses of these drugs often cause serious social and emotional problems. Barbiturate overdose occurs frequently. Withdrawal from barbiturates may lead to convulsions and death. The inhalation of the fumes from chemicals such as airplane glue produces sensations resembling alcohol intoxication. Inhaling volatile substances can be harmful to the brain, liver, and kidneys. By developing regard for our physical, emotional, mental, and social functioning and well-being, we are less likely to harm ourselves through drug misuse or abuse.
HUMAN GROWTH AND DEVELOPMENT *pp. 241-242 Also see FAMILY LIVING INCLUDING SEX EDUCATION	Bodily changes that occur during puberty prepare girls and boys for adulthood. In boys, puberty involves the growth of hair on the face and pubic areas, changes of voice, and maturation of the reproductive system. In girls, puberty involves the growth of hair under the arms and in the pubic region, development of the breasts, the onset of menstruation, and maturation of the reproductive system.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
MENTAL HEALTH *pp. 9-14 Also, see FAMILY LIVING INCLUDING SEX EDUCATION Time: 7 hours	Personality development is influenced by hereditary and environmental factors. Adolescent needs are satisfied in a variety of ways. Adolescence is a period of striving toward emotional and social adjustment.
DRUG AND SUBSTANCE ABUSE *pp. 32-44 Time: 13 hours	Proper drug use is taking a substance for its intended purpose and in the appropriate amount, frequency, strength, and manner prescribed. Drug abuse is the use of any drug to the point where it interferes with an individual's physical, social, and emotional well-being. There is a variety of drugs which are used and abused by individuals. There is a variety of individual and social factors that influence misuse and abuse of drugs. There are ways to cope with social and emotional pressures of life other than through use of drugs. A preventive program involves the cooperative efforts of all segments of the community. Government agencies have specific responsibilities to regulate and control the use of drugs. Treatment and rehabilitation programs aim to help drug abusers become drug free and capable of assuming responsible roles in the community.

HEALTH EDUCATION GRADE 8
(Intermediate - Junior H. S.)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
ALCOHOL *pp. 82-86 Time: 6 hours	Historically, alcohol has been used in a variety of ways and for different purposes. The consumption of alcoholic beverages affects the body in many ways. There is a relationship between consumption of alcoholic beverages and behavior and personality. Alcohol abuse and alcoholism affect the individual, the family, and the community.
SMOKING *pp. 104-112 Time: 6 hours	Smoking is a critical health problem. Smoking has a harmful effect on the lungs and heart. There are social and psychological factors that contribute to the smoking habit.
DISEASE PREVENTION AND CONTROL *pp. 130-141 Time: 10 hours	Communicable diseases are caused by infectious agents transmitted from one person to another either directly or indirectly. Prevention and control of communicable diseases are related to blocking pathways of infection, improving body resistance, and providing early treatment. Included among the important communicable diseases that continue to be a challenging community problem are venereal diseases. Chronic ailments such as heart disease, cancer, and diabetes are the leading causes of disability and death.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
NUTRITION *pp. 176-191 Time: 5 hours	Nutrition affects one's physical growth and development. Nutrition affects physical growth and appearance by its influence on the body. Nutrition affects personality, vigor, and ambition. Good nutrition requires a sufficient quantity of nutrients for proper body functioning. Good nutrition requires a proper balance of nutrients. Good nutrition is promoted by establishing good food habits and good attitudes toward food.
CONSUMER HEALTH *pp. 216-222 Time: 7 hours	Good judgment in the selection and utilization of health services and products enhances health and saves money. Health quackery deprives the consumer of adequate health protection. Advertising may mislead individuals in their selections and use of health information, products, and services. Governmental and professional groups protect the public from fraudulent health practices.
ENVIRONMENTAL AND COMMUNITY HEALTH *pp. 238-249 Time: 7 hours	One's health and well-being are influenced greatly by environment. Air pollution, a serious health problem, is a product of increased population and heavy industrialization. Water pollution, a menace to our health and a threat to the economy, contributes to the ever-growing problem of water shortage. Widespread use of chemicals in combating pests has created additional environmental health hazards. Noise pollution has become an important environmental health problem. Continuous use of radiation or radioactive material presents numerous potential health hazards.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
SAFETY AND FIRST AID *pp. 270-274 Time: 11 hours	Potential for accidents exists everywhere in man's environment. Behavior contributing to accidents may be the results of imitation, failure to follow directions, carelessness, or inability to recognize hazards. Individuals should be prepared to act effectively in case of accident.

Mathematics

Grades 5-9

Mathematics

Overview.....68

Grade 5.....69

Grade 6.....74

Grade 7.....78

Grade 8.....82

Grade 9(pre-algebra)..86

Grade 9(algebra).....89

MATHEMATICS

The mathematics curriculum involves the development of ideas and skills related to the areas of arithmetic, problem solving, measurement, geometry, probability, statistics, graphs, logical thinking and algebra.

The program is logical, systematic and developmental. The mathematics follows a spiral pattern in that the development of concepts and operations is repeated at increasing levels of difficulty.

In the primary grades, pupils manipulate, arrange and work with objects and other physical materials to observe relationships that can be symbolized in mathematical terms.

Beginning with collections of physical objects in the classroom, children move from non-verbalization to verbalization and symbolization. Operations are introduced with activities on sets of concrete objects. By exploration and play, children learn the number facts of arithmetic and the meaning of each operation in a concrete way.

At the same time that arithmetic concepts and skills are being developed, concepts from algebra, geometry, problem solving, and measurement are introduced. Children observe and later verbalize relations between numbers and their graphs on the number line. Fundamental operations with whole numbers, fractions, and decimals are developed gradually. Experimentation and discovery are methods used to help pupils develop an understanding of important properties of our number system, properties of geometric figures, and measurement ideas - both metric and customary.

In the intermediate and junior high school years, the scope of mathematics content is broadened to include more geometry, arithmetic, probability, and algebra. The students come to understand mathematics as a unified whole by perceiving interrelationships among concepts, skills and knowledges. They learn to apply the various branches of mathematics to science, industry, career and consumer education and citizenship. They come to appreciate mathematics as an indispensable tool for living in our technological socity.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
NUMBER; NUMERATION *pp. 23, 24, 34, 42, 44	Counting by thousands to hundred thousands Place value concepts through hundred thousands; period chart Reading and writing four-, five-, six-digit numerals Ordering and comparing whole numbers Use of greater than (>), less than (<), and equal to (=) symbols Round whole numbers to the nearest hundred; to the nearest thousand; to the nearest ten thousand Estimating quantities Concept of decimal notation: .4 .68 Decimal system of numeration - tenths; hundredths Counting by tenths; by hundredths Comparing and ordering tenths; hundredths Reading and writing decimal numerals Equivalent decimals .1 = .10 Relationship between decimal system of notation and dollars and cents Round numbers in decimal form to nearest whole number
ADDITION AND SUBTRACTION OF WHOLE NUMBERS *pp. 24, 25, 30, 37	Algorithm for computing sums and differences of numbers in the thousands; ten thousands; hundred thousands; dollars-and-cents system Algorithm for computing sums of more than 2 addends, sums less than 1 million Application of principle of related operations; of commutative property Estimation - checking for reasonableness of an answer
MULTIPLICATION OF WHOLE NUMBERS *pp. 26, 31, 36, 39, 40	Basic facts Multiple of a number: 6 is a multiple of 3 because 2 x 3 = 6 Algorithm for multiplication of four-place number by numbers less than 10

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE	70

Algorithm for multiplication using multiples of 10 as factors:

$$\begin{array}{r} 10 \\ \times 10 \\ \hline \end{array} \qquad \begin{array}{r} 10 \\ \times 20 \\ \hline \end{array}$$

10 as one factor and the other factor named by a two-place number

$$\begin{array}{r} 10 \\ \times 13 \\ \hline \end{array}$$

Factors named by a two-place number

$$\begin{array}{r} 34 \\ \times 12 \\ \hline \end{array}$$

Multiples of 10 and multiples of 100 as factors

$$\begin{array}{r} 100 \\ \times\ 10 \\ \hline \end{array} \qquad \begin{array}{r} 200 \\ \times\ 20 \\ \hline \end{array}$$

A two-place number as one factor and a three-place number as another factor

$$\begin{array}{r} 321 \\ \times\ 23 \\ \hline \end{array}$$

Estimation - checking for reasonableness of the product

DIVISION OF WHOLE NUMBERS

*pp. 26, 27, 28, 29, 32, 36, 39

Basic facts - apply the concept of multiplication and division as inverse operations

$7 \times 5 = 35$ so $\square \times 5 = 35$ or $5\overline{)35}$

Concept of division as repeated subtraction

Algorithm for division of three-place numbers by numbers less than 10, long and short forms

$$\begin{array}{r} 213 \\ 3\overline{)639} \\ -600 \\ \hline 39 \\ -30 \\ \hline 9 \\ -9 \\ \hline 0 \end{array} \qquad \begin{array}{r} 200 \\ 10 \\ 3 \\ \hline 213 \end{array} \qquad \begin{array}{r} 213 \\ 3\overline{)639} \end{array}$$

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Algorithm for division of three-place numbers by two-place numbers $23\overline{)851}$ Estimation - checking for reasonableness of the quotient
FRACTIONAL NUMBERS: COMMON FORM; DECIMAL FORM *pp. 25, 26, 28, 29, 38, 39 34, 35, 36, 42	Concepts: Fraction as an indicated quotient $1 \div 3 = \frac{1}{3}$ Any whole number can be expressed as a fraction with a denominator of 1 $5 = \frac{5}{1}$ Counting; comparing -- expressing comparison as $\frac{1}{2} > \frac{1}{4}$ Fraction names for 1 $\frac{10}{10} = 1$ Improper fraction $\frac{15}{10}$ Mixed numeral $7\frac{3}{10}$ Equivalent fractions with denominators of 2, 4, 8; 5, 10, 100 Procedures for: Expressing a mixed numeral as an improper fraction Expressing an improper fraction as a mixed numeral or as a whole number Finding common denominator Algorithms for addition and subtraction of fractional numbers with related denominators $2\frac{1}{4} + 7\frac{3}{8} = \square$ $3\frac{3}{8} - 2\frac{1}{4} = \square$ with unlike denominators $2\frac{1}{2} + 3\frac{1}{5} = \square$ $3\frac{2}{5} - 1\frac{1}{3} = \square$

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Algorithms for computing sums and differences using tenths: .4 + .3 = ☐ 7.9 - 5.3 = ☐ using hundredths: .04 + .03 = ☐ 7.09 - 5.03 = ☐ Algorithm for computing products of fractional numbers 2 x $\frac{1}{3}$ = ☐ $\frac{1}{2}$ x $\frac{1}{2}$ = ☐
MEASUREMENT *pp. 25, 27, 29, 33, 44	Linear: Estimating length; reading scales on rulers; measuring perimeter Standard units - kilometer, meter, decimeter, centimeter, millimeter mile, foot, inch Relationships between standard units: 1 m = 100 cm = 1000 mm 1 m = 10 dm Weigh: Estimating weight; reading scales on measuring devices Standard units - metric ton, kilogram, gram, milligram pound, ounce, ton Relationships between standard units: 1000 mg = 1 g Capacity: Estimating capacity; reading scales on measuring devices Standard units - kiloliter, liter, milliliter ounce, cup, pint, quart, gallon Relationships between standard units 1 kL = 1000 L Time: Estimating lengths of time Relationships: months-years; seconds-minutes-hours;

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	days-weeks-months Concepts of decade and century Temperature: Measuring temperature using Celsius and Fahrenheit thermometers Standard units - degree ^{o}C and degree ^{o}F Reading and writing temperature measurement $0^{o}C$ - freezing point of water
GEOMETRY *pp. 29, 32, 43	Polygons (quadrilaterals, triangles, pentagons) Some characteristics of the circle Concept of circumference
GRAPHS; STATISTICS; PROBLEM SOLVING; PROBABILITY *pp. 24, 25, 30, 31, 36, 37	Meaning of average (mean) Computing average Collecting and organizing data Constructing and interpreting bar graphs; line graphs Deriving word problems and questions relevant to the bar and line graphs Recognizing the appropriate number operation(s) needed to solve word problems

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
NUMBER: NUMERATION *pp. 3, 4, 5, 7, 8	Place value concepts to millions; period chart Reading and writing five, six, seven-digit numerals Writing numerals using expanded notation 77,777 = 70,000 + 7,000 + 700 + 7 Estimating quantities Rounding whole numbers to the nearest hundred-thousand; to the nearest million Divisibility: 100,000 is divisible by 5 Factors: 3 is the product of two factors, 3 and 1 Decimal system of numeration: tenths; hundredths; thousandths Comparing and ordering tenths, hundredths, thousandths Renaming decimal numerals 1.2 as 12 tenths Reading and writing decimal numerals Expressing decimal numerals in expanded notation .647 = .6 + .04 + .007 Rounding tenths to the nearest whole number
ADDITION AND SUBTRACTION OF WHOLE NUMBERS *pp. 4, 13	Compute sums and differences involving any whole numbers less than 10 million Estimation and checking Verbal problems involving addition and subtraction Computation with dollars and cents
136 MULTIPLICATION OF WHOLE NUMBERS *p. 9	Algorithm for multiplication: using multiples of ten and multiples of one thousand 10 x 1000 = □ 20 x 2000 = □ using a four, five, and six-place number as one factor and a two-place number as another factor 2356 x 23

137

*MATHEMATICS: Grade 6 · Scope and Sequence · Curriculum Bulletin · 1970-71 Series No. 4

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Multiplication by 10; by 100; by 1000 Verbal problems involving multiplication Estimation and checking Computation with dollars and cents
DIVISION OF WHOLE NUMBERS *p. 9	Algorithm for division of four-place numbers by two-place numbers, long and short forms Estimation - checking for reasonableness of the quotient Division by 10
FRACTIONAL NUMBERS: COMMON FORM; DECIMAL FORM *pp. 6, 7, 8, 9, 10, 11, 12, 14, 17, 18	Concepts: Meanings of fraction; equivalence; ratio Common denominator; least common denominator; Relationship between common form and decimal form Procedures for: Renaming fractional numbers $\frac{6}{8} = \frac{3}{4}$ $\frac{1}{10} = \frac{10}{100}$ Expressing fractional numbers in simplest form $\frac{6}{8} = \frac{3}{4}$ $\frac{27}{8} = 3\frac{3}{8}$ Finding common denominator; least common denominator Algorithms for addition and subtraction of fractional numbers with like and unlike denominators $2\frac{1}{3} + 4\frac{1}{2} = \square$ $6\frac{5}{6} - 4\frac{1}{2} = \square$ Algorithm for computing products of fractional numbers and mixed numbers $\frac{1}{2} \times \frac{3}{4} = \square$ $1\frac{3}{4} \times 2\frac{1}{2} = \square$ Algorithm for computing sums and differences using tenths;

hundredths; thousandths
Algorithm for computing the product of:
a whole number and tenths
a whole number and hundredths
a whole number and thousandths
tenths by tenths .3 x .5 = ☐
hundredths by tenths .7 x .21 = ☐
Algorithm for computing the quotient of tenths and of hundredths by a whole number
$2\overline{).8}$ $4\overline{)24.88}$
Estimation - checking for reasonableness of the sums, differences, products and quotients

MEASUREMENT
*pp. 8, 9, 12, 15, 17, 19

Linear:
Estimating length; measuring perimeter; measuring circumference
Standard units - kilometer, meter, decimeter, centimeter, millimeter
mile, foot, inch
Relationships among standard units
1 mm = 0.1 cm - 0.001 m
1 m = 0.001 km
Area:
Rectangle and square
Standard units - square centimeter, square meter
square foot, square inch
Volume:
Rectangular prism
Standard units - cubic centimeter, cubic meter
cubic inch, cubic foot
Weight:
Estimating weight
Standard units - metric ton, kilogram, gram, milligram
ton, pound, ounce

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Relationships between standard units 2 kg = 2000 g 1 g = 1000 mg Time: Relationships: hour - minute - second hour - day - year rates: kilometers/hour; meters/second miles/hour Temperature: Measuring temperature using Celsius and Fahrenheit thermometers Standard units - degree Celsius (^{o}C) degree Fahrenheit (^{o}F) Reading and writing temperature measurement 100^{o}C - boiling point of water
GEOMETRY *pp. 9, 14, 15, 17, 19	Some properties of plane figures (circle, quadrilaterals) Concept of rectangular region Some properties of rectangular prisms, i.e. solids whose bases are rectangles.
GRAPHS; STATISTICS; PROBLEM SOLVING; PROBABILITY *pp. 4, 14, 6, 8, 11, 12	Constructing, reading and interpreting line, bar and picture graphs Mean (average) Deriving word problems relevant to the graphs Determining the procedures needed to solve verbal problems Translating verbal problems into mathematical terms (sentences) Solving word problems involving the basic operations with whole numbers, fractional numbers, decimals and units of measure

MATHEMATICS GRADE 7

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
NUMBER AND NUMERATION	Place value concepts to billions Reading and writing numerals through 10 billions Exponential notation through 10^9, e.g., 10^9 = 1,000,000,000 Rounding whole numbers to the nearest million Rounding to nearest dollar, dime, cent Meaning of prime number and composite number Ratio Factors, e.g., factor x factor = product; greatest common factor Positive and negative numbers
OPERATIONS AND APPLICATIONS: WHOLE NUMBERS	Addition and subtraction of whole numbers through ten-billions Properties of addition Estimation: checking for reasonableness of an answer Computing the product of any whole number and a number named by a three-digit numeral Properties of multiplication Division of whole numbers (divisors to 99) Problem solving involving addition, subtraction, multiplication and division Meaning of divisibility Multiples, common multiples, least common multiple

Note: Minimum Teaching Essentials for Grade 7 are based on the new Scope and Sequence for Grades 7 and 8.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
OPERATIONS AND APPLICATIONS: FRACTIONAL NUMBERS	Equivalent fractions; comparing fractions Simplest name for a fraction Fraction as an indicated division Addition and subtraction of like and unlike fractions and mixed numerals Multiplication of fractions and mixed numerals Meaning of reciprocal Division of fractions and mixed numerals Problem solving involving operations with fractional numbers
OPERATIONS AND APPLICATIONS: DECIMALS	Decimal fractions through ten-thousandths Equivalent decimals; comparing, ordering, rounding decimals to the nearest thousandths Relationships between decimals and fractions Addition and subtraction of decimal numerals Multiplication of decimal numerals Division of decimal numerals Problem solving involving operations with decimal numerals; dollars and cents Banking and consumer skills
OPERATIONS AND APPLICATIONS: PERCENT	Percent as a ratio Relationships among percents, fractions, decimals Finding a percent of a number Finding what percent one number is of another Using percent in problems involving commission, discount rates, simple interest, sales tax, comparing prices

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
GEOMETRY	Concepts and terms: point, space, line, line segment, ray Lines: intersecting, parallel, perpendicular Polygons: triangle, parallelogram, rectangle, square, rhombus, trapezoid, pentagon, hexagon, octagon Space figures: rectangular prism, cube, cylinder Circle: semicircle, radius, diameter, center, central angle, arc, chord, circumference Angles: vertex, right, acute, obtuse, straight
MEASUREMENT	Approximate nature of measurement Angle measure: degrees, use of protractor Area: rectangle, square Volume: rectangular prism; cube Linear: measuring perimeter, circumference, concept of π (Pi) nonstandard and standard units of measure Metric measure: length, weight, capacity, temperature; prefixes; relationship among the units within the metric system; computing with metric measures
ALGEBRAIC CONCEPTS	Meaning of equality; equation; variable Deriving equations from verbal problems Solving equations: $x + 4 = 12$ $\quad 3x = 15$ $x - 5 = 3$ $\quad \frac{x}{5} = 9$ Using formulas Order of operations Deriving a table of values from a formula

148

149

MATHEMATICS GRADE 7

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
GRAPHS; STATISTICS	Gathering and organizing data Arithmetic mean (average); median, mode Drawing, reading and interpreting line graphs, bar graphs, circle graphs and pictographs
OPERATIONS AND APPLICATIONS: INTEGERS	Comparing and ordering positive and negative numbers Addition of integers

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
NUMBER AND NUMERATION	Place value concepts through hundred billions Read and write numerals through hundred billions Exponential notation through 10^{11} Rounding whole numbers to the nearest billion Factors: greatest common factor, factor table Prime and composite numbers
OPERATIONS AND APPLICATIONS: WHOLE NUMBERS	Addition and subtraction of whole numbers through hundred billions Properties of addition Estimation - checking for reasonableness of an answer Computing product of any whole numbers Properties of multiplication Division of whole numbers Problem solving involving basic operations, banking and consumer skills
OPERATIONS AND APPLICATIONS: FRACTIONAL NUMBERS	Meanings of a fraction Equivalent fractions Comparing and ordering fractions Simplest form of a fraction Addition and subtraction of fractions and mixed numerals Meaning of reciprocal Multiplication and division of fractions and mixed numerals Problem solving involving operations with fractional numbers

NOTE: Minimum Teaching Essentials for Grade 8 are based on the new Scope and Sequence for Grades 7 and 8.

MATHEMATICS GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
OPERATIONS AND APPLICATIONS: DECIMALS	Decimals through hundred-thousandths Equivalent decimals; comparing; ordering Rounding decimals to the nearest whole number, nearest tenth, nearest hundredth, nearest thousandth Relationships between decimals and fractions Expressing a fractional number in decimal form, e.g., $\frac{3}{8} = .375$ Addition, subtraction, multiplication, and division of decimal numerals Terminating decimals; repeating decimals Dollars-and-cents system; unit pricing Problem solving involving operations with decimal numerals
OPERATIONS AND APPLICATIONS: PERCENT; RATIO; PROPORTION	Concept of ratio as an ordered pair of numbers Concept of rate Concept of proportion; scale drawing Problem solving involving ratio and proportion Finding a percent of a number; finding what percent one number is of another Finding percent of increase, discount, attendance Percents greater than 100% and less than 1% Simple interest, profit and loss, income tax Installment buying, sales tax, discount Commission, profit and loss
GEOMETRY	Concepts and terms applied to: lines, angles, polygons, space figures Congruence and similarity Angles: right, acute, obtuse, straight, vertical, adjacent, corresponding, complementary, supplementary,

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	measuring angles; sum of angle measures Triangles: classification by measures of sides, angles; Pythagorean formula
MEASUREMENT	Approximate nature of measurement Linear measure: use of ruler, perimeter of polygons, circumference of a circle Area of parallelogram, triangle, circle; (verbal problems involving area) Surface measurement: rectangular prism, cube Volume of rectangular prism, cube, right circular cylinder Metric measure: length, weight, capacity, temperature
ALGEBRAIC CONCEPTS: EQUATIONS AND INEQUALITIES	Meaning of equality, inequality, variable, equation Deriving equations from verbal problems; solving verbal problems Solving equations: $5a + 2 = 17$ $x + 7 = 5$ $3y = 2$ Flow charts Concept of a function Ordered pairs; locating a point in a plane using an ordered pair Graphing equations in two variables Solving inequalities: $x > 5$ $x + 3 < 8$ Order of operations Using formulas

MATHEMATICS GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
OPERATIONS AND APPLICATIONS: INTEGERS; ROOTS	Positive and negative integers Comparing and ordering integers Adding and subtracting integers Square root of a perfect square; square root table
STATISTICS; PROBABILITY	Mean, mode, median as averages; frequency; range Concepts of probability Probability as a ratio; as a percent

MATHEMATICS GRADE 9 (PRE-ALGEBRA)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
WHOLE NUMBERS AND INTEGERS *pp. 7-10; 12-23 ***pp. 145-115; 227-236	Base ten system of numeration: place value, reading and writing numerals; exponents and powers; rounding numbers Four basic operations: finding the sum and difference of whole numbers; finding the product and quotient of whole numbers (divisors less than 100) Prime and composite numbers Positive and negative integers: concept; order; addition; subtraction in practical applications only, e.g., temperature
FRACTIONS AND DECIMALS *pp. 3-8; 57-58 **pp. 63-70; 85-86 ***pp. 48-57	Fractions and mixed numerals: meaning, equivalence, comparison; simplest form; ordering (using inequality symbol) Basic operations with fractions and mixed numerals; applications and problem solving, including discount Decimal notation: place value, equivalence, comparison, ordering, rounding; fractional and percent equivalents Basic operations with decimals and dollars and cents; applications and problem solving
RATIO; PROPORTION; AND PERCENT *pp. 46-57; 122-123 **pp. 43-68; 153-160 ***pp. 180-265	Ratio; equivalent ratios; proportion; scale drawing; map reading and interpretation Percent: meaning; relation to fractions and decimals; finding percent of a number; finding what percent one number is of another Applications: simple interest; discount, commission; sales ta

*FUNDAMENTALS OF MATHEMATICS, Part 1 Experimental Curriculum Bulletin 1978
**FUNDAMENTALS OF MATHEMATICS, Part 2 Experimental Curriculum Bulletin 1978
***GENERAL MATHEMATICS 9th Year · Curriculum Bulletin · 1964-65 Series No. 16

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
GEOMETRY AND MEASUREMENT *pp. 25-45; 124-144; **pp. 72-88; 106-110; 125-136; 162-168 ***pp. 42-91	Concepts and terms applied to : point, line, plane Angles and triangles: identification and classification; right triangle relationship Quadrilaterals: identification and classification The circle: its parts; circumference Polygons: perimeter of polygons; problems involving perimeter Solid geometric figures: rectangular solid, cube, cylinder, cone, sphere, pyramid Metric system: linear, weight, capacity, temperature Use of ruler: customary and metric units Area: rectangle, square, triangle, circle Volume: rectangular solid, cube, cylinder Operations with denominate numbers, including time
EQUALITIES AND THEIR GRAPHS *pp. 1-2 **pp. 15-42; 137-147; 158-180 ***pp. 10-30; 186-190; 214-226	Symbols of equality and inequality in number expressions Solving equations: $x + 7 = 12$ $x - 4 = 9$ $2x = 6$ $2x + 1 = 11$ $\frac{x}{4} = 8$ $\frac{2x}{3} = 8$ Writing, interpreting, evaluating, and graphing formulas Solving a proportion: $\frac{x}{3} = \frac{4}{12}$ Locating a point in a plane using an ordered pair Graphing linear equations in two variables: $x + y = 7$ Reading and interpreting graphs of formulas Using the Phythagorean formula

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PROBABILITY; STATISTICS; AND GRAPHS *pp. 58-100 **pp. 169-180 ***pp. 124-145; 166-185	Reading and interpreting pictographs, line graphs, bar graphs, circle graphs Graphing linear equations in two variables; formulas Collecting, organizing, and interpreting data Concept of average: mean, median, mode Meaning of probability; probability as a ratio
CONSUMER AND BANKING SKILLS *pp. 101-103; 114-123 **pp. 43-68 ***pp. 96-123	Unit pricing; comparing prices; installment purchases; sales tax Computing income: wages and salaries; overtime; commission Savings and checking accounts; simple interest, discount Phone, utility, and postal rates Reading charts, tables, travel schedules Applications of mathematics in career areas Rentals, mortgages, and insurance

MATHEMATICS GRADE 9 (ALGEBRA)

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
SYMBOLS IN MATHEMATICS *pp. 1-7; 48-50 **pp. 1-2	Order of operations The letter as a variable
RATIONAL NUMBERS: OPERATIONS AND PROPERTIES *pp. 9-47; 61-73; 179-180	Addition of signed numbers; additive identity and additive inverse Subtraction of signed numbers Multiplication of signed numbers: distributive property of multiplication over addition and multiplicative inverse Division of signed numbers Zero property of multiplication
LINEAR EQUATIONS IN ONE VARIABLE *pp. 7-8; 57-60; 73-81; 122-124	Verbal expressions and mathematical symbolism Equations: formulas; using distributive property; verbal problems
POLYNOMIALS *pp. 50-57 81-86; 92-114	Polynomials: coefficients, factors, and exponents Formulas: as open sentences, evaluation Addition of monomials; of polynomials Subtraction of polynomials Multiplication of monomials, of polynomials: polynomial by a monomial, binomial by a binomial Simplifying members of an equation Verbal problems, e.g., perimeter

*MATHEMATICS 9th Year Curriculum Bulletin : 1966-67 Series, No. 4

**Addendum to Mathematics 9th Year Bulletin

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
EQUATIONS AND INEQUALITIES *pp. 115-121; 124-134; 87-90	Verbal problems: uniform motion, overtake, roundtrip Inequalities
DIVISION OF POLYNOMIALS *pp. 175-185	Division of monomials Division of polynomials: polynomial by a monomial; polynomial by a binomial; polynomial by a binomial with a remainder
SYSTEMS OF EQUATIONS AND GRAPHS *pp. 83-85; 90-91; 135-174 **pp. 13-17	The coordinate plane Graphing a linear equation in two variables Slope and Y-intercept Graphical solution of a system of two linear equations in two variables Algebraic solution of a system of equations Verbal problems: number and business problems involving two variables; dry, mixture; investment; digit Graphing a linear inequality; graphing a system of linear inequalities
FACTORING AND QUADRATIC EQUATIONS *pp. 186-198; 203-210	Factoring polynomials Multiplying two binomials by inspection; special products of trinomials, of binomials Factoring polynomials: difference of two squares, $ax^2 + bx + c$ $a = 1$ $a > 1$ Quadratic equations Verbal problems: involving quadratic equations; area

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
ALGEBRAIC FRACTIONS *pp. 211-234	Simplifying fractions through factoring: monomial numerators and denominators; polynomial numerators and/or denominators Multiplying fractions Dividing fractions Combining (adding, subtracting) fractions: like monomial denominators; monomial numerators and unlike monomial denominators; polynomial numerators and unlike monomial denominators Solving fractional type equations: monomial numerators and monomial denominators;binomial numerators and monomial denominators Verbal problems:work; number; involving equations with fractions
THE REAL NUMBERS *pp. 235-262 **pp. 3-4; 7-10	Rational numbers Real numbers; irrational numbers associated with points on the number line Significant digits Meaning of square root; approximation of square root Pythagorean theorem Radicals: simplifying; multiplying and dividing; combining
RATIO; PROPORTION AND INDIRECT MEASUREMENT *pp. 271-277; 282-298	Ratio; proportion Solving ratio and proportion problems using algebraic methods Indirect measurement: similar triangles; tangent, sine, and cosine ratio; trigonometric problems

Physical Education

Grades 5-9

phys ed

Overview.....95

Grade 5.....96

Grade 6.....99

Grade 7.....101

Grade 8.....105

Grade 9.....110

PHYSICAL EDUCATION

The goal of physical education is to provide children and youth with regular, planned, vigorous physical activities on a daily basis which will serve to promote physical fitness and cardiovascular efficiency and help to prevent heart disease. Additional benefits of physical education include socialization in a guided setting, an improved self-image, recognition of the talented and gifted student of dance, sports and gymnastics, and opportunity for the development of interests and leisure-time activities.

There is evidence that children perform better physically once they understand the concepts of movement. Therefore, movement education is essential in the elementary school grades. It is ideal for developing awareness of space, direction, pathways, levels, body parts and uses, manipulative skills, locomotor and non-locomotor skills. It offers experiences for individual performance, devoid of the constraints of group competition. In grades K-4, there is a stress on movement skills and activities such as song plays, rhythms, dance, simple stunts and games which reinforce and enhance movement concepts. In grades 5-6 movement concepts are reinforced and applied in stunts and tumbling, apparatus, team and individual sports, dance, and physical fitness. In grades 7-9 there is an even greater emphasis on participation in a variety of games, sports, dances, gymnastics, martial arts, and physical fitness which may serve students as lifetime activities and interests.

All activities are geared to both boys and girls in a coeducational setting, and are adaptable to the needs and interests of special (handicapped) students, as required by recent legislation.

It is expected that both classroom teachers in the elementary schools and physical education specialists in grades K-9 will be able to utilize the Minimum Teaching Essentials and the new curricula on which they are based.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
SPORTS SKILL DEVELOPMENT	
Basketball	Exploring how to pass, catch and shoot Discovering efficient ways of performing these skills Refining catching below and above the waist passing - chest pass, chest bounce pass, push bounce pass shooting - chest shot, chest foul shot, underhand foul shot Applying skills in squad activities and lead-up games Knowing formations for practice of drills - single/double lines, circle, semi-circle
Soccer	Exploring how to trap, dribble, kick, and pass Discovering efficient ways of performing these skills with different parts of the foot Refining how to trap with sole of foot, one knee, both knees Dribbling with inside of foot and toe Kicking and passing with inside/outside of foot, top of instep, heel, toe Applying these skills to squad activities and lead-up games Knowing formations for drills - single/double lines and circles
Track and Field	Exploring starts, running form for sprints, visual baton pass, and standing broadjump Refining indoor sprint start, outdoor sprint start, standing start, crouching start, running form, visual baton pass, standing broadjump Applying these skills to squad and lead-up activities Knowing formations for drills - single and double lines and circles

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
GYMNASTICS	
Stunts and Tumbling	Exploring rolls--forward, backward, log balances--headstand, handstand, cartwheel Gaining efficiency in rolls and balances Refining these skills Executing forward roll from a squat, backward roll, continuous rolls on several mats, frog headstand, headstand
Apparatus: Balance Beam	Exploring ways of mounting and dismounting the beam and performing locomotor movements Discovering efficient ways of mounting, dismounting and performing locomotor movements Executing locomotor movements: Walks - forward, backward, sideward dips walk to center of beam, turn and return Dismounting with an upward jump with arms straight up and body arched
Apparatus: Vaulting Box	Exploring mounting and dismounting and vaulting over low sections of the box Discovering efficient ways to mount, dismount,and vault over the box Approaching the box from right or left side preparatory to performing on it Jump on box, kneel and jump off. Execute vaults with body moving over higher sections of the box. Execute a forward roll on the box.
DANCE	Combining specific locomotor steps to music Performing two-step, step-hop, walk, balance, heel-toe, run

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
DANCE (Cont.)	Performing patterns: circle, star, swing, lines of three, wheel, do-si-do Performing: Cowboy Schottische, Danza (Puerto-Rican), Red River Valley, Sicilian Tarantella
PHYSICAL FITNESS	
AAHPER Youth Fitness Test Items	Achieving physical fitness levels necessary to pass national and standardized tests: pull-ups, flexed-arm hang, sit-ups, shuttle run, long jump (standing broad jump), 50-yard dash, 600-yard run-walk
Rope Jumps	Performing endurance jump--120 jumps per minute Performing speed jump--35 in 10 seconds Performing coordination jump--cross rope forward

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
SPORTS SKILL DEVELOPMENT	
Basketball	Exploring passing over a greater distance, shooting with one hand, dribbling Discovering efficiency in these skills Refining skills: long pass, two-hand overhead pass, dribbling to a basket and shooting, one-hand shot, push-shot Applying skills to squad activities and lead-up games Knowing formations for drills -- single file, leader and group, parallel, and zigzag Knowing rules of lead-up games
Soccer	Exploring blocking and heading Discovering efficiency in these skills Refining skills Applying skills to squad activities and lead-up games Knowing formations for drills Knowing rules of lead-up games
Track and Field	Improving execution of standing broad jump Exploring throwing a softball for distance Discovering efficiency in throwing a ball for distance Refining skills of jumping for distance, throwing for distance and running Executing 50-60-100 yard dashes and 220-yard relay Refining visual baton pass for 220-yard relay Applying skills in squad activities -- pass it to me; measure my jump.
GYMNASTICS	
Stunts and Tumbling	Refining execution of log, forward backward and shoulder rolls Executing forward roll from a run, backward roll from a jackknife position, headstand to a forward roll, headstand with assistance
Apparatus: Balance Beam	Refining mounts and dismounts Executing one-knee mount, squat mount, jump straddle dismount, seat straddle, front scale and "V" seat Refining locomotor movements on the beam: Step-hop, skip, toe-touch walk, plie walk

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Vaulting Box	Refining mounts: Kneel mount, squat mount with hand support, standing mount Refining dismounts: 1/4 and 1/2 turns, kneel and forward roll, swan jump-off Refining vaults: Standing front squat vault (left and right side), front squat, vault and run
DANCE	Executing a variety of steps: walk, balance, hora (side step - hop run), polka, skip, grand right and left Using steps in the formation of various patterns Performing: all-American promenade, hora, jessie polka, maypole dance
PHYSICAL FITNESS	
AAHPER Youth Fitness Test	Achieving physical fitness levels necessary to pass national and standardized tests: pull-ups, flexed arm hang, sit-ups, shuttle run, standing broadjump, (long jump), 50-yard dash, 600-yard run, 600-yard walk
Rope Jumps	Performing endurance jump: 150 jumps per minute Performing speed jump: 45 in 10 seconds Demonstrating coordination and agility; Cross rope forward and backward while jumping; execute double pass of rope under the feet on each jump

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
DANCE	
SQUARE DANCE	
Basic Steps and Movements	Hand turns, swing left and right, forward and back, promenade, corners and partners position, honor your partner, do-si-do, allemande, grand star, ladies chain, right and left through, pass through, California twirl, lead through, buzz steps, chasse, grapevine twist, dixie chain
INDIVIDUAL, DUAL AND LEISURE-TIME SPORTS	
GYMNASTICS	
Parallel Bars	Dips, cross rest to straddle seat, straddle travels, front and rear dismounts
Uneven Parallel Bars	Mount to arm support, straight arm support, squat stand mount, chinning
Horizontal Bar	Pull-ups, skin the cat, leg raise to tuck, forward and backward swing, swing back dismount
Side Horse	Squat vault, front vault, front rest support, back rest support, feint
Long Horse Vaulting	Jump to squat, walk to end, jump off Jump to straight leg stand, walk to end, jump off
TUMBLING AND FLOOR EXERCISES	Forward roll, backward roll, combination rolls, back bend front scale
Rope Climbing	Skin the cat, crab hang, inverted hang, basic climbing position, climb one-quarter way up
Handball	Stance and footwork, basic strokes, serve, basic shots
Paddle Ball	Grips, swings, stance and footwork, basic shots, serves

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
INDIVIDUAL, DUAL AND LEISURE-TIME SPORTS (continued)	
TENNIS	
Basic Strokes	Forehand and backhand - grip, stance and swing serve - grip, stance, ball and racket coordination
TRACK AND FIELD	
Sprints	Starts - Indoor and outdoor Running form - Use of arms, stride
Relay Racing	Baton pass - visual
Long Jump	Standing long jump
High Jump	Scissors
TEAM SPORTS	
BASEBALL - SOFTBALL	
Basic Skills	Catching - low and high balls Throwing - Overhead snap, infielder's sidearm, underhand toss Fielding - flyball and ground ball Pitching (softball) - fast ball, slow ball Batting - straight away Base running - run to first base and turn, steal Defensive skills - infield and outfield

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PHYSICAL FITNESS, CONDITIONING AND BODY MECHANICS	
CALISTHENICS	Understanding of role of calisthenics as a daily remedial, warm-up and conditioning activity
Isotonic Exercises	Push-ups, squat thrust, sit-ups, jumping jacks, modified pull-ups, running in place, knee raise
Isometric Exercises	Contractions held for six to ten seconds with two-second rests between contractions Press hands together overhead, hands hooked at chest-pull apart, pressing palms against hips, sitting position, press hands against floor
WEIGHT TRAINING	Understand value of resistive exercises in achieving physical fitness high pull-ups; two-arm standing curls; two-arm standing press
CIRCUIT TRAINING	Pull-ups, squat thrusts, step-ups, alternate presses, sit-ups, dips on parallel bars, shuttle run, barbell curl; running in place
PHYSICAL FITNESS TESTS	Conduct the annual physical fitness test and encourage students to achieve physical fitness levels necessary to pass National Standardized Tests.
AAHPER Youth Fitness Tests	Pull-ups, sit-ups, flexed-arm hang, shuttle run, long jump, 50-yard dash; 600-yard walk-run

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
TEAM SPORTS	
BASKETBALL	
Basic Skills	Catching -- Above and below the waist Passing -- Two-hand chest, two-hand bounce, underhand, hand-off Shots -- Layup right and left, one-hand set, foul Dribbling -- Straight-away, change of hand Defensive skills -- Basic stance, sideward shuffle
SOCCER	Offensive skills -- Give and go
Basic Skills	Dribbling -- Inside, outside of foot Heading -- Forward Throw-In -- Feet together, one foot advanced Tackling -- Basic stance, one leg tackle Kicking -- Inside of foot straight and sideways, short push pass Trapping -- Wedge, chest Goal Keeping -- Stance and catching
COMBATIVES	
WRESTLING	
Basic Positions	Top and bottom referees positions
Holds and Counters	Far ankle, far-arm breakdown to half nelson or crotch pin Side roll to counter, bridge and turn into counter Sit-out and turn-in to counter sit-out Far ankle drive to waist lock Snap-back counter to sit-out and turn-in Wing and step over counter to half nelson Near arm and waist lock Flatten-out counter for side roll Head pry level Rock of Gibraltar

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PHYSICAL FITNESS, CONDITIONING AND BODY MECHANICS	
CALISTHENICS	Understanding of role of calisthenics as a daily remedial, warm-up and conditioning activity
Isotonic Exercises	Push-ups, squat thrust, sit-ups, jumping jacks, modified pull-ups, running in place, knee raise
Isometric Exercises	Contractions held for six to ten seconds, with two-second rest between contractions Press hands together overhead, hands hooked at chest - pull apart, pressing palms against hips, sitting position; press hands against floor
WEIGHT TRAINING	Understand value of resistive exercise in achieving physical fitness - high pull-ups, two-arm standing curls, two-arm standing press
CIRCUIT TRAINING	Pull-ups, squat thrusts, step-ups, alternate presses, sit-ups, dips on parallel bars, shuttle run, barbell curl; running in place
PHYSICAL FITNESS TESTS	Annual physical fitness testing - Achievement of physical fitness levels necessary to pass National Standardized Tests.
AAPHER Youth Fitness Tests	Pull-ups, sit-ups, flexed-arm hang, shuttle run, long jump, 50-yard dash, 600-yard walk-run

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PHYSICAL FITNESS, CONDITIONING AND BODY MECHANICS (continued)	
DANCE	
MODERN DANCE	
Conditioning Techniques	Bent-knee bounce, straight-leg bounce, prance Preparation
Sitting and Kneeling	Sitting and kneeling, lying techniques
Standing and Locomotor	Position A, B, C knee bends, walk, foot preparation for the walk Performance and creation
INDIVIDUAL, DUAL AND LEISURE-TIME SPORTS	
BADMINTON	
Basic Skills	Grip -- Forehand and backhand Player positions -- Center court, ready, footwork Serve -- Low serve, placement Strokes -- Overhead clear, forehand and backhand drive, backhand clear
BOWLING	
Basic Skills	Stance - Erect Ball delivery -- Position for straight ball, four-step approach, release, follow-through

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
INDIVIDUAL, DUAL AND LEISURE-TIME SPORTS (continued)	
GOLF	
Basic Skills	The grip, back swing, down swing, putting, use of irons
GYMNASTICS	
Parallel Bars	Forward Roll
Uneven Parallel Bars	Cross seat mount, pull off low bar with quarter turn, crotch seat
Horizontal Bar	Leg raise -- Straight knee, forward roll to hang
Side Horse	Flank vault, rear vault, single-leg cut forward - Half circle
Long Horse Vaulting	Squat vault, straddle vault
Balance Beam	Straight-arm support mount, straight-arm seat mount, crotch-seat mount, walk on beam, dip step, leg swing, simple run, V-seat, arabesque, front and knee scales, toe balance from knee scale, simple jump dismount
TUMBLING AND FLOOR EXERCISES	Tip-up, handstand with support, cartwheel Dual stunts: Knee-to-shoulder balance, swan balance, foot-to-hand balance, double roll, elephant walk, back-to-back roll, pyramids
Rope Climbing	Climb half-way -- hands and feet

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
TRACK AND FIELD	
High Jump	Western Roll
Hurdles	Low Hurdles -- Start and form
TEAM SPORTS	
BASEBALL - SOFTBALL	
Basic Skills	Fielding -- Ground ball in the outfield Pitching (softball) -- Windmill delivery Batting -- Sacrifice bunt Base running -- Advance for extra bases, steal and slide Defensive skills -- Backing up players, outfield throw to the infield, force-outs, run-downs, throws to bases
BASKETBALL	
Basic Skills	Passing -- Baseball, one-hand side arm; cross-chest Shots -- One-hand jump, underhand lay-up over front rim Dribbling -- Chance direction, dribble, stop and pass-off Defensive Skills -- Forward and backward shuffle, 3-2 zone, 2-3 zone, 1-2-2 zone Offensive Skills -- Horseshoe weave
FLAG FOOTBALL	
Basic Skills	Stance -- Lineman and backfield Passing -- Overhand

PHYSICAL EDUCATION GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
TEAM SPORTS (continued)	
FLAG FOOTBALL	
Basic Skills (continued)	Catching -- Above and below the waist Ball Carrying -- Center-quarterback exchange, hand-off Blocking -- Brush, shoulder Kicking and punting Defensive Skills -- Line and backfield
VOLLEYBALL	
Serving	Underhand, open-palm
Passing and Volleying	Flick pass -- above and below the waist, spike, forward set pass and spike
Rotation	Simple -- basic
Defensive Skills	Blocking

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PHYSICAL FITNESS, CONDITIONING AND BODY MECHANICS	
CALISTHENICS	Understanding role of calisthenics as a daily remedial, warm-up and conditioning activity
Isotonic Exercises	Push-ups, squat thrust, sit-ups, jumping jacks, modified pull-ups, running in place, knee raise
Isometric Exercises	Contractions held for six to ten seconds with two-second rest between contractions, press hands together overhead, hands hooked at chest -- pull apart, press palms against hips, sitting position, press hands against floor
WEIGHT TRAINING	Understand value of resistive exercises in achieving physical fitness; high pull-ups, two-arm standing curls, two-arm standing press
CIRCUIT TRAINING	Pull-ups, squat thrusts, step-ups, alternate presses, sit-ups, dips on parallel bars, shuttle run, barbell curl, running in place
PHYSICAL FITNESS TESTS	Annual physical fitness testing. Achievement of physical fitness levels necessary to pass National Standardized Tests
AAHPER Youth Fitness Test	Pull-ups, sit-ups, flexed-arm hang, shuttle run, standing broad jump, 5- yard dash, 600-yard walk-run

PHYSICAL EDUCATION GRADE 9

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PHYSICAL FITNESS, CONDITIONING AND BODY MECHANICS (continued)	
DANCE	
SOCIAL DANCE	
Basic Techniques	Dance, walk or glide; hesitation patterns; balance patterns; side-close patterns; box patterns
Basic Rhythms	Even-wait rhythms; 3/4 waltz rhythm; fox trot rhythm, Latin dance rhythm
Dance with Partner	Social amenities; open and closed positions; one-quarter swing turns; variation of basic patterns
INDIVIDUAL, DUAL AND LEISURE-TIME SPORTS	
TENNIS	Review of basic skills taught in grade seven Emphasis upon achieving a higher level of performance
Basic Strokes	Forehand and backhand -- grip, stance and swing serve-grip, stance, ball and racket coordination
GYMNASTICS	
Parallel Bars	Shoulder stand, one-leg cut mount, forward roll to straddle, L support, hip roll, inside swing turn, outside swing turn
Uneven Parallel Bars	Single leg flank vault, under swing on low bar, leg circles, counter swing, stride leg support-low bar, front somersault-low bar, back hip circle

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Horizontal Bar	Hip swing-pullover, single knee mount, forward knee circle to hang, underswing dismount
Side Horse	Thief vault, single leg cut forward - full circle, leg cut with travel to group or neck, vault dismount from hang
Long Horse Vaulting	Stoop vault
TUMBLING AND FLOOR EXERCISES	L support, backward roll with snap down, head stand, forward and backward roll with half-twist
Rope Climbing	Climb to top -- Hands and feet
HANDBALL	Fist or punch and full arm underhand stroke, straight arm underhand stroke, underhand serve, chop and spin serves, high-lob serve, low-drive serve, volley off the wall
Paddleball	Power grip, backhand leap swing, forehand swing, opposite hand, volley from face or chest, half volley, short hop volley, overhead return, overhead drive, overhead lob, overhead drop, overhead smash, mixing the serve
TRACK AND FIELD	
Sprints	Start outdoor with blocks
Distance Running	Body angle, arm swing, stride
Relay Racing	Baton pass - non-visual

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
TRACK AND FIELD (continued)	
Long Jump	Running long jump
Triple Jump	Step and leap, running triple jump
High Jump	Review scissors and western roll Emphasis upon achieving higher level of performance
Hurdles	Low hurdles -- Review of eighth grade skills
Shot Put	Stance, pivot, glide, follow-through
TEAM SPORTS	
BASKETBALL	
Basic Skills	Passing -- Hook, two hand overhead Shots -- Layup from left side with left hand, hook Defensive Skills -- Boxing out Offensive Skills -- Faking, breaking up a zone defense, figure weave
GYM HOCKEY	
Basic Skills	Stick Handling -- Grip and stance, dribbling, drive Passing and Fielding Game Skills -- Goalkeeper, offensive and defensive players

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
SOCCER	
Basic Skills	Dribbling -- Inside, outside of foot Heading -- Sideways Tackling -- Two-leg tackle, charging, blocking Feinting -- Foot feint Kicking -- Outside of foot flick, heel kick, short pass toe kick Trapping -- Inside, outside of foot Goal Keeping -- Position play, punt after catch, throw-out
VOLLEYBALL	
Basic Skills	
Serving	Underhand -- Closed fist
Passing and Volleying	Chest Pass -- Two hand Forward set pass Forearm Bump Dig Pass -- One hand
Defensive Skills	Serve Defense
COMBATIVES	
WRESTLING	Review of skills taught in the seventh grade Emphasis upon achieving a higher level of performance
Basic Positions	Top and bottom referees positions
Holds and Counters	Far ankle, far arm breakdown to half-nelson or crotch pin Side roll to counter, bridge and turn-into counter Sit-out and turn-in to counter sit-out Far ankle drive to waist lock Snap-back counter to sit-out and turn-in Wing and step over counter to half-nelson Near arm and waist lock Flatten-out counter for side roll Head pry level Rock of Gibraltar

Science
Grades 5-9

Overview.....115

Grade 5.....117

Grade 6.....123

Grade 7.....127

Grade 8.....134

Grade 9.....142

SCIENCE

In these times of great scientific advancement and opportunity, we are increasingly dependent upon a scientifically literate population. Our young people must be guided to explore, to discover, and to understand the scientific concepts which will be of value to people in a changing world. Science meets the needs of all pupils since it offers them endless opportunities to explore, to manipulate, and to discover as they strive to find the what, how, and why of the world around them. The pupil-oriented laboratory science program is designed to provide a variety of experiences in the form of laboratory investigations, demonstrations, trips, and projects which will appeal to all children of varying backgrounds and interests.

The design of the science program provides a set of basic experiences and instructions for which all pupils are responsible. Pupils are frequently exposed to familiar objects as a basis for study. New ideas, laboratory skills, and science vocabulary are introduced at a pace which permits easy assimilation. Understandings and interrelationships are constantly reinforced through frequent referral to previous studies. In addition, lessons and units contain concrete suggestions for stimulating a more in-depth study by providing extended enrichment studies for students whose interests and abilities warrant them.

The science content combines the two components of science instruction: process and knowledge. To accomplish this, the following approaches have been used in teachers' guides.

There has been a greater stress on the important concepts underlying each of the disciplines of physics, chemistry, biology, and earth science, and the interrelationships among them.

Laboratory investigations and experimentation have been integrated into the science lessons where student involvement would make the greatest impact. There has been a greater emphasis on critical thinking, investigation, and problem-solving as ways of learning.

SCIENCE GRADE 5

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
HOW MAN CHANGES MATERIALS *pp: 26-49 Time: 6 weeks	
Separating Substances	Fresh water may be obtained from salt water by the processes of evaporation and condensation of the water, leaving the salt behind. Filters and strainers separate particles of different sizes. Solids which do not dissolve may be separated from liquids by using a filter or strainer. Some liquids which do not mix can be separated by standing.
Chemical Changes	Living things such as bacteria, yeast, and mold make changes in food. These changes are souring, changing sugar into alcohol and carbon dioxide, and changing alcohol to vinegar. Carbon dioxide gas is made when baking powder is mixed with water. Household bleach releases oxygen which combines with a dye and changes it. Rust forms when iron combines with oxygen. Fuel, sufficient air, and heat are needed for burning. Fires can be put out by removing the fuel, cutting off the air supply, or lowering the temperature. When a candle burns, water and carbon dioxide are produced. When a different substance is made, a chemical change occurs.

*SCIENCE - GRADE 5, #6, 68-69 Series

SCIENCE GRADE 5

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
LITTLE ENVIRONMENTS *pp: 50-76 Time: 5 weeks In the Schoolyard, On and Under A Tree, On the Lawn, In the Soil, In the Water	Many kinds of plants and animals live in New York City. The living things vary in size. Each kind of environment has its own conditions of heat, moisture, wind, light, minerals, air, plants, and animals. Plants and animals depend upon each other and their environment for food, warmth, shelter, air, and water. Green plants are producers, animals are consumers. Certain microscopic bacteria and fungi are decomposers. Living things change the environment.
THE SUN'S FAMILY *pp: 77-105 Time: 5 weeks Planet Earth in the Solar System	The earth is one of nine planets which orbit around the sun. Planets are illuminated by light from the sun and move in elliptical orbits around the sun. The distance of a planet from the sun varies during its revolution. Planets are at different distances from the sun; those closest to the sun move the fastest. Asteroids and comets are part of the solar system.

SCIENCE GRADE 5

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Our Star, The Sun	The sun is a nearby star; stars are distant suns. The sun shines because of its own atomic activities. Life depends on the sun. The sun rotates on its axis and could accommodate over a million earths inside it. It takes light eight minutes to travel from the sun to earth. The entire solar system moves in space.
CLIMATE *pp: 106-137 Time: 7 weeks	
Climate and Weather	Climate is the average weather for a region over a long period of time. There are many climates in the United States. The most important characteristics of a climate are temperature and moisture.
Climate and Latitude	Latitude is the distance of a place from the equator and determines year-round temperature. The more slant to the sun's rays, the less heating results. Winds are caused by the unequal heating of the earth.
Climate and Oceans	Water warms up and cools off more slowly than land. Coastal cities are warmer in winter and cooler in summer than inland cities at the same latitude. The West Coast climate is different from that of the East Coast because of prevailing westerlies. There is a water cycle.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Climate and Mountains	Mountains affect temperature and rainfall. The higher the elevation, the cooler the region. The side of a mountain facing the wind has more rainfall than the other side. When moist air is pushed up a mountain, it cools, the water vapor condenses into clouds, and rain may fall.
MIRRORS AND THE REFLECTION OF LIGHT *pp: 138-157 Time: 5 weeks	
Seeing With Mirrors	The image of an object is reversed in a mirror, left to right. Tilting a mirror at different angles helps to see other objects. A mirror works because it reflects light.
Mirrors Reflect Light	A mirror changes the direction of light striking it. The path of light reflected from a mirror can be changed by facing the mirror in different directions. Light can be reflected many times. The angle of incidence equals the angle of reflection.
MAKING IT GO *pp: 158-188 Time: 6 weeks	
Muscles Make It Go	Muscles move many tools and machines. Muscles move arm and leg bones to which they are attached. Muscles work in pairs opposing each other.
Flowing Water Can Make It Go	Water flowing downstream can move heavy loads and turn wheels. Running and falling water can exert a force. A dam is built across a body of water to raise the level of the water behind it. The sun is the source of energy for flowing water.
Wind Makes It Go	The heating of the earth causes winds. Winds move sailboats and turn windmills.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Steam Makes It Go	Steam from water boiled in a confined space can push very hard. Steam turns the blades of wheels and drives propellers of ships. Steam gets its driving force from burning fuel or nuclear energy.
Rapid Burning Makes It Go	Hot gases are produced when fuels burn. In some engines, the hot gases push against the pistons which drive wheels or propellers which make the vehicle go. In jets and in rocket engines, hot gases are blown out of the rear end causing the vehicle to go forward. Jets use oxygen from the air; rockets carry their own supply.
BATTERIES AND BULBS *pp: 189-218 Time: 6 weeks	
Bulbs in Different Kinds of Circuits	Electricity flows in a circuit. A series circuit provides only one path for the current. A parallel circuit provides two or more paths for the current. In a parallel circuit, the other bulbs will remain lit if one bulb goes out. In a series circuit, all the bulbs go out if one goes out.
Dry Cells in Different Kinds of Circuits	The voltage of a series arrangement of dry cells is equal to the sum of the voltages of the individual cells. The voltage of a parallel arrangement of similar cells is equal to the voltage of any individual cell.
Fuses	A fuse is a special metal strip that is part of a circuit which melts when too much electricity flows through it.

SCIENCE GRADE 6

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGES
LIVING THINGS AND THE ENVIRONMENT *pp: 1-67, lessons 1-24 Time: 24 periods	
Finding Out About the Environment	The environment is composed of all living and non-living things that surround an organism. The environment may change with place and time. The change may be sudden or gradual. Light, water, air, temperature and soil are physical factors of the environment.
Perceiving the Environment	We perceive the environment through our five senses. Our senses are adapted in different ways to identify conditions in the environment. We use many instruments to extend our senses and to make more accurate observations. Measurements are ways of describing and communicating characteristics of an environment.
The Climate Affects The Environment	Air is matter and therefore has weight and exerts pressure equally in all directions. The ocean of air surrounding the earth is called the atmosphere. The changes in the weather occur in the lower part of the atmosphere. Air is a mixture of various gases and particles that are important to living things. We use a variety of instruments to measure changes in the environment which affect weather-temperature, pressure, humidity, wind speed and direction and clouds.

*INVESTIGATING OUR ENVIRONMENT, Science: Grade 6, Experimental Edition, June 1974

SCIENCE GRADE 6

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGES
	Climate is a condition of the environment over a long period. Living things that survive in an environment have developed different ways of adapting to the environment. Humans modify their environment by controlling the effects of the weather (heating, air conditioning and clothing).
Other Environments	Communities of plants and animals also live in aquatic environments. Living things have adaptations which enable them to survive conditions in aquatic environments.
INTERACTIONS IN THE ENVIRONMENT *pp: 68-118, Lessons 25-45 Time: 20 periods	
Life Activities	A study of many different organisms shows that all living things require food, oxygen and water, and suitable temperature range to survive. When changes are gradual, some species of living things may eventually adapt to the changed environment. In a balanced environment, there is a constant interaction among plants, animals and the non-living factors of the environment.
Interrelationships of Living Things	Living things depend on other living things for food. Green plants are the primary source of food for other living things. All living things have special adaptations for obtaining their food, moving about in the environment and protecting themselves from predators and the environmental conditions. Living things may also serve as an environment for other living things. The human body has developed many defenses against disease-producing organisms.

SCIENCE GRADE 6

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGES
The Organization of a Stable System	The interaction of the various populations in a community with each other and with the non-living physical environment make up a complete ecosystem. Many factors affect the population of a community. They include food, water, sunlight and available space. The interaction of the living things in the system results in a balance of nature. Changes in the balance result in competition and elimination of some parts of the ecosystem.
ENERGY IN THE ENVIRONMENT *pp: 119-188, lessons 46-69 Time: 23 periods	
The Sun is the Source of All Energy	The measurement of energy from the sun may be accomplished by having students use a variety of science devices. Conditions in the atmosphere affect the amount of sunlight reaching the earth. Plants need sunlight to grow and make food. Humans are affected by light in a variety of ways. The exposure may be beneficial at times or harmful at other times. The energy that drives the water cycle comes from the sun. The sun's energy that is stored on earth in the form of fossil fuels was once part of living plants and organisms. This supply is rapidly diminishing because of increased use. Solar energy may be used directly as a source of heat and electrical energy.
Alternate sources of Energy	In the future, scientists will look to other forms of energy including wind, moving water, tides, geothermal heat and atomic fission and fusion.

125

SCIENCE GRADE 6

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGES
Energy Forces Change The Environment	The forces of wind, moving water, and heat in the earth are constantly changing the shape of the earth's surface. The energy for building up or breaking down the earth's surface comes from the sun or from heat within the earth.
MAN CHANGES THE ENVIRONMENT *pp: 189-238, lessons 70-88 Time: 20 periods	
We Add Pollutants to the Environment	Pollutants are waste materials that are harmful to the environment. Air pollutants are gases or particles not normally found in air. Air pollutants affect the health of living things, damage property and cause changes in the environment and weather conditions. Water becomes polluted when chemicals, organic wastes and heat are added to water. Population changes result in changes in the environment and increased competition for available food and space. Other kinds of pollution (heat and sound) also affect living things. Changes in environments can be so rapid that living things cannot adjust and do not survive.
Improving Our Environment	Solid waste may be used in a variety of ways to make it useful including recycling, land fill, construction, energy source. Special farming techniques, selection and ocean farming will result in increased crop yields. Practicing conservation will conserve our natural resources and endangered species.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
CHEMISTRY	
ELEMENTS *pp: 1-21 Time: 12 periods	
The Study of Matter	Matter is anything that has weight and occupies space. The states of matter are solid, liquid, and gas. Change in state of matter is accomplished by adding and removing energy and occurs at specific temperature.
Matter Can Be Identified By Its Appearance	Characteristics and behavior of different substances are known as properties. The study of properties helps to identify different substances.
The Building Blocks of Matter are Elements	An element is the simplest substance which still retains the properties of that element. They occur as solids, liquids, and gases. Elements are classified as metals and non-metals. The properties of metals and non-metals aid in identifying these substances.
COMPOUNDS AND MIXTURES *pp: 22-48 Time: 12 periods	
Combining Elements to Form Compounds	Elements combine in definite proportions to form new substances called compounds. The properties of compounds are different from those of the elements that make up the compounds.

*SCIENCE - GRADE 7, 71-72 Series, #2

SCIENCE GRADE 7

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	The smallest part of a compound that still has the properties of the compound is a molecule.
Chemical and Physical Change	A physical change is a change in size, shape, or state. A chemical change results in the formation of a new substance with new properties.
The Characteristics of Mixtures	Mixtures consist of two or more substances each of which retains its own properties. Mixtures involve a physical change only; there is no definite ratio or proportion between the amounts of each substance. The parts that make up a mixture can be separated by various techniques.
PHYSICS	
ELECTRICITY *pp: 87-108 Time: 10 periods	
Electric Current	An electric current is a flow of electrons from the negative to positive terminals. Laboratory investigations dealing with series and parallel circuits compare the different paths each follow.
Resistance	The resistance of a wire carrying an electric current is related to its length, thickness, and composition.
Measurement of an Electric Current	The voltmeter, ammeter, and the ohmmeter are useful instruments in measuring the electromotive force, the current, and the resistance of electrical circuits.

SCIENCE GRADE 7

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
MAGNETISM *pp: 109-136 Time: 12 periods	
The Characteristics of Magnets	Magnets are made of iron, nickel, and cobalt. Magnets are strongest at the poles. A magnetic field surrounds all magnets. Like magnetic poles repel, unlike poles attract.
Making and Destroying Magnets	Magnets may be created by electrical induction or contact with other magnets. Magnets may be destroyed by heating, hammering, or rubbing in different directions.
Earth's Magnetic Field and the Compass	Because of the nature of the earth's core, the earth acts as a huge magnet. A magnetic compass responds to the earth's magnetic field and helps us determine direction.
Electromagnetism	A coil of wire carrying an electric current and surrounding a soft iron core will induce a temporary magnetism in the core. The strength of an electromagnet depends on the number of turns of wire, the amount of current, and the size of the iron core. Electromagnets are used in bells, buzzers, loudspeakers, and scrap iron lifts.
Creating An Electrical Current	The movement of a permanent magnet in a coil of wire induces an electrical current.

SCIENCE GRADE 7

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
HEAT *pp: 137-150 Time: 6 periods	
Heat Affects the Size of Matter	When heated, matter will expand. Thermometers (Celsius and Fahrenheit) are used to measure temperature.
Heat Can Be Transferred	Heat may be transferred by radiation, conduction, and convection.
BIOLOGY *pp: 161-176 Time: 8 periods	
LIVING THINGS	
Life Activities	Living things carry out a variety of life functions which include digestion, respiration, circulation, movement, response, growth and reproduction. The microscope helps us to study living things too small to be seen with our eyes.
Identifying the Needs of Living Things	Plants and animals have basic needs such as food, water, air, and a proper environmental temperature to carry on life activities. Investigations with plant and animal organisms confirm similarities of life functions of all living things.

SCIENCE GRADE 7

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
THE STUDY OF THE CELL *pp: 177-194 Time: 7 periods	
The Structure and Function of Cells	Living things are composed of one or more cells. Cells contain small units which have specific functions. A study of plant and animal cells shows they differ in many ways.
Multicellular Organisms	In higher forms, cells become specialized to perform specific functions.
Cells are Organized Into Tissues and Organs	A group of cells, similar in structure and function, is called a tissue. Different tissues are organized to work together to form an organ. Each body organ has a specific function to perform.
Organ Systems	The study and understanding of the major organ systems help us to identify life functions and maintain good health.
NUTRITION *pp: 196-222 Time: 10 periods	
Foods Contain Useful Substances	Food contains useful substances called nutrients. The nutrients required by living things include carbohydrates, proteins, water, minerals, and vitamins. Specific tests may be performed to identify nutrients in different foods.

SCIENCE GRADE 7

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Nutrients Help to Maintain Life Functions	Green plants synthesize the nutrients necessary for life activities by a process called photosynthesis involving the use of chlorophyll and sunlight. The nutrients supply us with materials for growth, repair, and maintenance of good health.
A Balanced Diet	A balanced diet is one that is planned to include all necessary nutrients in sufficient quantities to maintain good health.
EARTH SCIENCE	
ROCKS AND MINERALS *pp: 230-255 Time: 12 periods	
The Structure of the Earth	The earth is made up of four layers: crust, mantle, outer core, and inner core. Each layer has certain characteristics and composition.
The Composition of the Earth's Crust	The earth's crust is made up of rocks and minerals. Rocks may be identified by the minerals present in the rocks. Various techniques and properties are used to identify different minerals. These include color, luster, hardness, streak, density, and cleavage.
Formation and Identification of Igneous, Metamorphic, and Sedimentary Rocks	The methods by which rocks were formed, their mineral content composition, crystal size, appearance, and properties provide a means of classification and identification of various rocks.

213

214

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
THE CHANGING EARTH *pp: 258-285 Time: 12 periods	
Factors Which Cause the Earth's Surface to Change	The surface of the earth is constantly being worn down physically and chemically by wind, water, plants and animals, chemicals, and glaciers. The study and understanding of processes of erosion, weathering, freezing and thawing, dune migration, wave movement, and glacial movements help to explain how the earth's surface is worn down.
Building Up the Earth's Crust	Pressure, heat, and movements of the earth's crust cause folding and formation of mountains. Lava flows from volcanoes and molten magma within the earth also help to build up the surface of the earth's crust.
THE IMPORTANCE OF FOSSILS	
Fossil Remains	Fossils are the remains or evidence of plants and animals that lived on this earth in the past. Fossils are formed from the hard parts of plants and animals, impressions or casts left by them, or by replacement of the original structure with minerals (petrification). Some insects and animals have been trapped in tar pits and resin which have preserved their remains. The identification of various fossils and a comparison with present forms provide us with evidence of evolutionary change, past climates, environmental conditions, and movements of the earth's surface.
Fossil Fuels	Coal and petroleum are the end products of a process which changed plants and marine organisms into fuels.

SCIENCE GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
CHEMISTRY	
LIQUID SOLUTIONS *pp: 1-39 Time: 12 periods	
Forming Solutions With Water	Liquids, solids, and gases which dissolve in water form homogeneous solutions. The dissolving substance is called the solute. The substance in which it dissolves is the solvent.
Using Other Solvents	Other liquids may serve as solvents for substances which will not dissolve in water.
Identifying Factors Affecting Time For Solutes to Dissolve	The rate of dissolving of solutes is affected by size of particles, mixing of solution, and temperature of solvent.
Changing the Boiling and Freezing Points of Water	The addition of solute to water lowers the freezing point and elevates the boiling point of water according to the amount of solute added.
Separation of Solute From Solvent	Dissolved solutes may be separated by distillation and evaporation. Distillation may be used to purify water.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
SUSPENSIONS AND EMULSIONS *pp: 40-57 Time: 8 periods	
Identifying Characteristics of Suspensions	Substances which do not dissolve in a liquid remain suspended in the medium. Suspensions can be identified by means of the Tyndall Effect (light beam). Suspended particles may be separated by filtering and sedimentation.
Special Kinds of Suspensions	An emulsion is a special kind of suspension of two immiscible liquids (oil and water, mayonnaise). Separation of the substances from the media is accomplished by coagulation and centrifugation. Mechanical blending, emulsifying agents (soap, pectin), and gel formation help to keep the parts in suspension.
ACIDS AND BASES *pp: 58-88 Time: 6 periods	
Identifying Acids and Bases	Acids and bases are special groups of chemical substances which can be identified by their special properties - changing color with indicators, reaction with metals. Many common acids and bases are used in the home - acetic acid, milk of magnesia. Salts of acids and bases help conduct electricity in solution.

SCIENCE GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PHYSICS	
ENERGY *pp: 100-114 Time: 5 periods	
Using Different Forms of Energy	Streams, wind, and moving water have mechanical energy. Other forms of energy are chemical, electrical, atomic, heat, light, and sound. Energy may be changed from one form into another called conversions. Energy can neither be created nor destroyed, only changed from one form into another.
FORCE AND WORK *pp: 115-132 Time: 6 periods	
Defining the Terms "Force and Work"	Force is defined as a push or pull on an object, while work is defined as a force which causes an object to move.
Measuring Force and Work	The stretch of a spring or the use of a balance may be used to measure force. Work is calculated by multiplying the force by the distance moved. Reducing friction and using devices with a mechanical advantage help us to do work with less force.
MACHINES *pp: 133-151 Time: 6 periods	
Using Mechanical Advantage of Machines To Do Work	Using such devices as the lever, pulley, and inclined plane demonstrateshow machines multiply force and make work easier.

SCIENCE GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Determining the mechanical advantage indicates the number of times a machine multiplies the effort force.
Measuring Mechanical Advantage	A knowledge and understanding of such terms as fulcrum, effort arm, resistance arm, and moments of force are essential to making calculations concerning mechanical advantage. Machines providing a mechanical advantage multiply the force necessary to do work, but decrease the distance (height) the object moves.
GRAVITY, DENSITY AND SPECIFIC GRAVITY *pp: 152-178 Time: 10 periods	
GRAVITY	
Finding Out Why Objects Have Weight	Objects fall toward the center of the Earth . The weight of an object is related to the force of gravity acting on that object. All substances exert pressure. Pressure in gases and liquids increases with depth
DENSITY	
Comparing Weight of Different Materials	Density is a ratio of the weight of a substance to its volume. Density is a specific property of a substance and always remains the same. This property helps us identify the substance.

SCIENCE GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
Determining Why Objects Will Float or Sink	Applying the concepts of density to Archimedes' Principle, we can determine that an object will sink when its weight is greater than the weight of an equal volume of water. The object will float if its weight is less than the weight of an equal volume of water. The loss of weight of a sinking object is equal to the weight of the displaced water.
BIOLOGY	
DIGESTION AND ABSORPTION *pp: 190-222 ' Time: 13 periods	
Identifying Different Parts of the Digestive System	The digestive system is a tube through which food is moved in order to break up and assimilate useful nutrients. Different parts of the digestive system are specialized to perform different operations of the digestive and absorption processes.
Determining How Food is Absorbed by the Body	Food must be made simpler (broken down) and changed (made soluble) before the nutrients may pass through the walls of the small intestine. Enzymes and digestive juices aid in the breakdown of food. The walls of the intestinal tract contain small structures called villi, which increase the surface area for absorption and selectively allow nutrients to pass through into the blood.

SCIENCE GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
CIRCULATION AND RESPIRATION *pp: 223-249 Time: 9 periods	
Finding Out How Blood Circulates	Comparing the circulatory system of different forms shows that it consists of a closed system of blood vessels (arteries, veins, and capillaries), the heart, and blood. The circulatory system is differentiated to perform different functions. The functions are concerned with transport of dissolved nutrients, removal of wastes, oxygen and CO_2 exchange, and defense against foreign organisms. The respiratory system and circulatory systems work together to provide oxygen to the cells of the body and remove oxidation wastes from the body. Specialized structures in the respiratory system facilitate the exchange of gases.
EXCRETION *pp: 250-257 Time: 6 periods	
Removal of Wastes	A study of the structures and function of the skin and kidney reveal how they are adapted to remove wastes and regulate body temperature.
EARTH SCIENCE	
THE ATMOSPHERE *pp: 288-334 Time: 18 periods	
Composition of Air	A study of the different parts of air reveals that air is a mixture of gases, including oxygen, nitrogen, and carbon dioxide. Specific tests demonstrate these gases in air.

Air also contains water, vapor, dust, and pollutants which affect the quality of air.
The atmosphere is divided into several sections of varying height.
Each part has definite characteristics associated with that region.

Heating the Air Near the Earth

By using various devices, it can be shown that radiant energy from the sun is absorbed by the earth and changed to heat energy. The air near the surface is heated by conduction and convection.
Warm air is lighter and is pushed up by cooler, denser air.
The movement of air gives rise to winds.
Differential heating of the surface of the earth and water, and the earth's rotation, produce convection currents or winds.

Air Pressure and Winds

Dry, cool air produces regions of high pressure. Warm, moist air develops areas of low pressure.
Air moves from regions of high to low pressure at speeds related to the differences in pressure.

Water in the Atmosphere

Water evaporates into the atmosphere from many sources.
The percentage of moisture in the air compared to what it can hold is called relative humidity. Calculations of dew point and humidity are important functions of weather predictions.
In the presence of dust particles, moisture condenses as clouds when the air is cooled.

WEATHER

*pp: 335-367
Time: 11 periods

Factors Affecting Weather

The study of the factors which cause changes in weather (temperature, humidity, precipitation, winds, air pressure, and sky conditions, clouds) helps us predict the weather.

SCIENCE GRADE 8

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	A weather station model of symbols is a convenient method of showing weather factors at a particular location. Weather factors are measured with a variety of instruments - windvane and anemometer, psychrometer, wind balloons, and barometer.
Changes in the Weather	Air masses are large areas of air with uniform temperature and humidity. Movements of air masses transfer the weather characteristics to the surface over which they are passing. The interaction of the fronts of the air masses effects a change in the weather.
Weather Station Models	Weather maps show the weather at many locations at the same time by means of station models. An understanding and interpretation of the weather symbols provide information about future weather conditions for any area. Meteorology is the study of weather and the construction of weather maps to forecast the weather.

SCIENCE GRADE 9

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PHYSICS	
CHARACTERISTICS OF SOUND *pp: 1-30 Time: 12 periods	
How Sounds Are Produced	Sounds are produced by vibrating bodies. Loudness depends on the energy used to make the sound (amplitude). The number of vibrations per second determines the pitch (cycle or hertz). The frequency is the number of cycles or vibrations per second. The greater the frequency, the higher the pitch.
Changing the Pitch of Sounds	The pitch of a stringed instrument depends on length, tension, and width of the string.
Transmitting Sounds	Sound waves can only travel through a medium as waves. Sounds will not travel in a vacuum.
Qualities of Sound	The quality of a sound depends on size, shape, and composition of the object making the sound. Thus, a trumpet, clarinet, violin, and the human voice differ in quality. Reflection and diffusion of sound waves are demonstrated experimentally.
CHARACTERISTICS OF LIGHT *pp: 31-70 Time: 15 periods	
Light As A Form of Energy	Light (unlike sound) does not require a medium. The speed of light is many times greater than sound.

*SCIENCE - GRADE 9, #9, 1968-69 Series

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Light travels in straight lines as transverse waves on both the horizontal and vertical planes. Using polarizing lenses confirms the nature of light waves.
Shadows and Light	Shadows are produced when light strikes an opaque material. An artificial eclipse produced in the laboratory permits an analysis of the parts of a shadow and confirms that light travels in straight lines.
Reflection of Light	The angle of incidence of light striking a plane mirror is equal to the angle of reflection of the reflected ray. Laboratory procedures confirm the Law of Reflection and Diffusion of Light Images.
Using Convex and Concave Lenses	Tracing the path of light through various lenses reveals how light is affected by the lenses. Prisms break up light into a spectrum of colors following the Law of Refraction.
CHEMISTRY	
REACTION OF METALS *pp: 72-118 Time: 15 periods	
Arrangement of Elements	Elements (metals and non-metals) are arranged as groups and families on the Periodic Table. Metals in the same family have similar properties.

SCIENCE GRADE 9

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Properties of elements are related to the electrons in the outer shell. Metals transfer electrons. Non-metals receive electrons. A compound represents electrons lent by the metal and electrons received by the non-metal.
Chemical Reactions	Chemical reactions are represented by balanced chemical equations using chemical symbols and reflecting the number of electrons gained or lost by the reactants.
ACTIVITY OF METALS *pp: 119-142 Time: 10 periods	
Electrons and Activity	A study of the different structures of atoms reveals why some metals are more active than others. Chemical corrosion (rusting, wearing away) is related to the chemical activity of the corroding agents. Alloys are combinations of metals which resist corrosion. We can plate objects with metals using electricity.
Using Different Metals in the Home	The special properties of a metal determine its use - lead, copper, silver, steel, aluminum, etc. An analysis of the special properties of a metal helps us to use it most effectively.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
EARTH SCIENCE	
ASTRONOMY *pp: 144-157 Time: 7 periods	
The Study of Astronomy and Space Science	We explore space, other planets, and stars to gain information about the origins of our own planet and its place in the universe.
Mirror and Lenses as Tools of Astronomy	We use reflecting and refracting telescopes to gather light information about objects in space. An understanding of the construction of telescopes aids in an understanding of how they operate in collecting light from distant bodies. We use a spectroscope to analyze the spectrum of light coming from space. The intensity of light from glowing bodies helps to provide information of distance, speed of movement, and temperature.
THE SOLAR SYSTEM *pp: 158-169 Time: 8 periods	
The Sun's Energy	The sun converts hydrogen nuclei into helium in a process known as nuclear fusion, with the release of heat and light. Sunlight provides energy for the earth and is involved in the manufacture of food by plants which releases oxygen to sustain life.

SCIENCE GRADE 9

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
The Motivation of the Moon	The revolution of the moon around the earth and the relative position of the earth, sun, and moon cause different phases to be seen. The moon's rotation is approximately the same as its revolution around the earth. Tidal changes occur as a result of the gravitational attraction of the moon.
Solar and Lunar Eclipses	A study of the positions of the sun, earth and moon help us to understand how eclipses occur.
ENERGY IN THE SOLAR SYSTEM *pp: 170-202 Time: 12 periods	
Moving Objects In Space	The tendency of an object in space to maintain whatever motion it had originally is called inertia. Inertia keeps objects in motion. The combination of gravitational attraction and inertia explains the orbiting motion of bodies in space.
The Earth's Rotation	The rotation of the earth on its axis causes night and day, deflection of winds and currents (Coriolis Effect), and apparent motion of celestial bodies.
Seasonal Changes	Seasonal changes occur as a result of the earth's inclination and its revolution around the sun so that different parts receive more heat-producing vertical rays. The earth's movement in relation to other celestial bodies forms the basis of time measurements.

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
PEOPLE IN SPACE *pp: 203-223 Time: 7 periods	
Astronauts Venture Into Space	Space travellers face many dangers in space including radiation, temperature extremes, lack of air, and special problems in obtaining food and water, and eliminating wastes. Scientists have developed techniques for eliminating the obstacles facing space travellers. Constellations of stars are one of the many ways that help space travellers navigate in space.
BIOLOGY	
CONTINUITY OF LIVING THINGS *pp: 224-270 Time: 18 periods	
Asexual Reproduction	The reproduction of an offspring from one parent is called asexual reproduction. Organisms will reproduce asexually by binary fission, budding, and sporulation. In each case, the daughter cells are exactly like the parent cell. Asexual reproduction involves mitosis, the division of chromosomes to each offspring without a reduction in the number for each cell. New plants may be grown from parts of a plant (root, stem, leaf) asexually by a method called vegetative propagation.
Sexual Reproduction In Plants	A study of parts of a flower aids in the understanding of sexual reproduction.

SCIENCE GRADE 9

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	Sexual reproduction involves the combination of two gametes coming from different parents, each bearing a reduced number of chromosomes. The transfer of pollen from the stamen to the pistil involves a variety of agents (wind, water, insects, animals). This results in fertilization and gives rise to the seed or embryo. The enlarged ovary, seed, stored food is called the fruit. Its purpose is to protect the seed, provide nourishment for the developing plant, and to attract animals to help disperse the seed.
Sexual Reproduction In Animals	Specialized organs in animals give rise to ova (female gamete) and sperm cells (male gamete). Fertilization involves the transfer and penetration of the sperm cell into the ovum to produce a zygote. Fertilization restores the chromosome number characteristic of that species. Fertilization and embryo development may occur outside the body (water-living animals) or inside the mother's body (land animals).
HEREDITY *pp: 271-305 Time: 12 periods	
Characteristics Are Inherited	The work of Gregor Mendel forms the basis of our present understanding of the Laws of Inheritance. Traits are located in the genes of chromosomes found in the nuclei of cells. The recombination of gametes bearing reduced number of chromosomes restores the chromosome number in the offspring. The new individual now carries traits from both parents. If genes from different parents are the same (tallness, brown-eyed, etc.) the individual has a pure trait. If different, the trait

CONTENT AREA AND TOPIC	SKILLS AND KNOWLEDGE
	is called a hybrid. The dominant gene shows itself over the recessive.
Environmental Effect on Traits	Both heredity and the environment are important in trait development. Genes are not affected by environmental conditions and changes. Eugenics is the science of plant and animal selection and breeding to improve the stock for greater yield.

Work Study Skills

WORK STUDY SKILLS

Work study skills are those which students require in order to study, to work in class individually or in small groups, to do homework assignments and independent research projects, and to find information for purely personal needs and interests. These skills are used in all subject areas and are developed in a continuum. For example, a kindergarten child finds a picture file of farm animals and selects a cow to illustrate a story. An eighth grader uses the Readers' Guide to Periodical Literature to obtain articles on environmental pollution in N.Y.C. Both are locating and selecting information, just as a student following verbal instructions for setting up a terrarium and a student reading directions on a mathematics test are both using the skill of following directions.

In this bulletin work study skills used in all subject areas are presented for each of three levels, K-2, 3-5, 6-9. The skills are grouped in five categories: following directions; locating information; selecting, recalling, and evaluating information; organizing information; and using graphic representation and investigative tools.

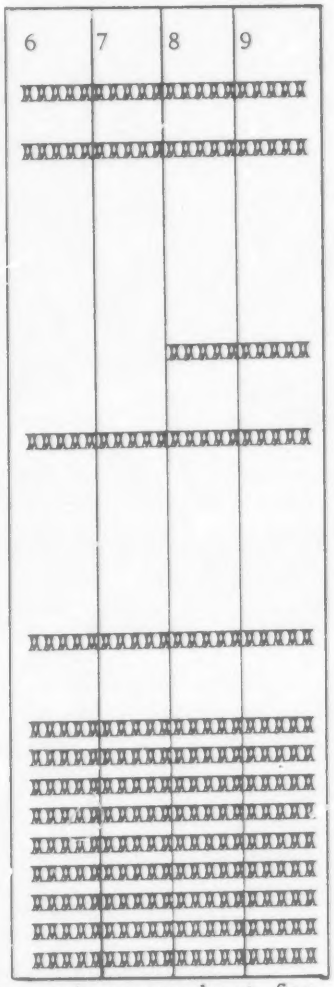
In addition, there is an emphasis on applying these skills to multimedia sources of information. We live in a world rich in communications media. Students need to be guided in developing responses, both to the information received and the effects of different media on the information presented. To do this students must be given opportunities for comparison and contrast.

The library-media center provides the means for meeting this need. Classroom teachers use the expertise of school librarians in cooperatively planning assignments which incorporate library research and media skills. Teachers and librarians also work jointly in helping children learn these skills. But it is the classroom teacher who must provide the impetus and perseverance necessary for students to acquire these skills in sustained and consistent use.

It is the responsibility of all teachers to (1) provide assignments which, in total, require all the work study skills for that level (2) to analyze which specific skills are needed to complete a particular assignment and (3) to make certain those specific skills are taught as an integral part of that assignment in every subject area. For the skills which require use of library resources, librarians have the responsibility to consult with the teachers on how specific skills may be applied to the topics teachers plan to teach.

WORK STUDY SKILLS GRADES 6-9
ALL SUBJECT AREAS

Students acquire skills through using them consistently in assignments relating to the curriculum in each subject area. For skills which require use of library resources, librarians cooperate with classroom teachers on how specific skills may be applied to topics teachers plan to teach.



FOLLOWING DIRECTIONS

Taking notes from oral directions requiring several steps

Applying pattern for following written directions
- Reading title
- Reading for overview
- Rereading for specific steps
- Carrying out steps
- Checking for correct completion

Applying skills in following directions to situations that reflect real needs in outside world, e.g., admissions applications, job applications

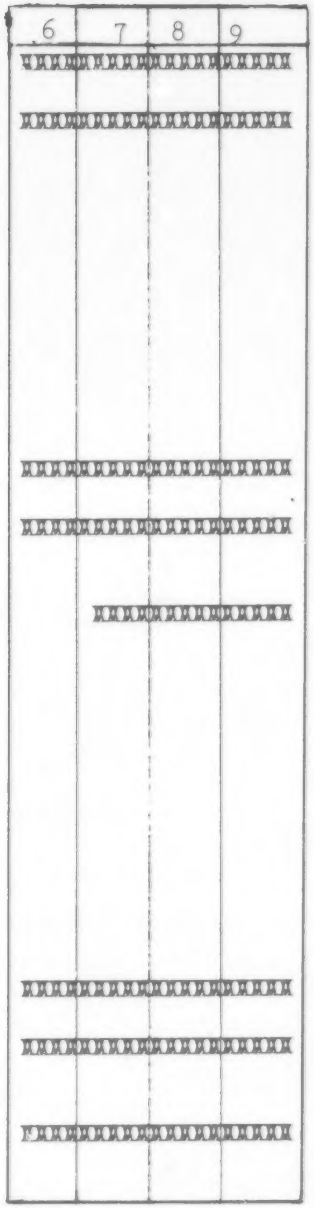
Independently following complex directions which require research skills, e.g., finding books, articles, audio visuals on a topic, and evaluating appropriateness of sources

LOCATING INFORMATION

Interpreting and rephrasing questions; narrowing topics; selecting key words to aid in location of information

Using reference sources*
- Dictionary
- Encyclopedia
- Atlas
- Telephone Directory
- Almanac
- Current Biography
- Readers' Guide to Periodical Literature
- New York Times Index

* These are examples of commonly used sources; librarians will help plan which specific sources are best for a particular assignment.



Scanning for specific information; skimming for overview

Using format in print material
- Table of Contents
- Copyright date
- Glossary
- Index
- Chapter, topic and subtopic heads
- Bibliography

SELECTING, RECALLING, EVALUATING INFORMATION

Appraising sources for relevance and reliability

Refining skills in selecting and integrating significant information from multiple sources

Using organized study methods such as SQ3R
- S - Surveys the chapter title, topic and subtopic headings to pick up the main ideas of the chapter
- Q - turns each topic into a question
- R - rapidly reads the material to answer questions
- R - recites or recalls the answers to questions previously posed or to questions at the end of the chapter
- R - reviews the material by constructing an outline for further study or by writing a summary

ORGANIZING INFORMATION

Refining skills in notetaking

Excerpting, classifying and/or categorizing more complex information from several sources in a variety of media

Analyzing and synthesizing data collected by scientists' tools

Extending outline technique using sentence and topic forms; and 2nd level subcategories:

I.
A.
1.
2.
B.
1.
2.

Using footnotes; preparing limited bibliography

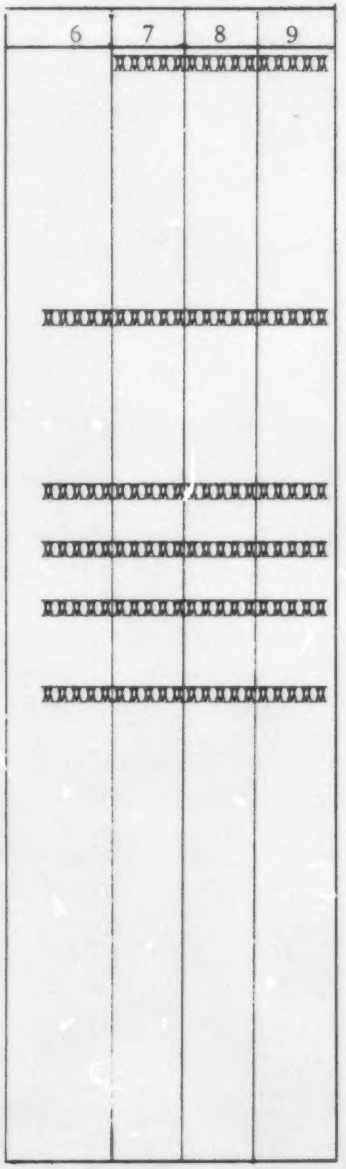
USING GRAPHIC REPRESENTATION AND INVESTIGATIVE TOOLS

Refining interpretation of more complex maps, charts, globes and tables

Manipulating more complex equipment in investigating problems.

Using a variety of measurements to investigate problems and support hypotheses

Constructing models of research designs



CHILDREN'S NEEDS

Basic needs, the same for all children, are the drives that influence behavior. These needs include:

1. **NEED TO BE VALUED**

   A child's self-image has top priority. A child can't be "somebody" unless the child is "somebody" to someone else. Self-image must be reflected in the eyes and actions of those the child loves and values. All children must be valued for who they are, where they come from, and what they bring with them from their culture, language, desires, and expectations.

2. **NEED TO DO**

   Children learn by using all their senses to explore, discover, and form judgments about the things in their world.

3. **NEED TO SHARE WITH PEOPLE THEY TRUST AND BE TRUSTED TO SHARE**

   Children need adults who care, who can guide the children's discovery into mutually respected action, who inspire and develop competence and confidence.

4. **NEED TO BE GIVEN A CHANCE TO GROW AT HIS OR HER RATE IN HIS OR HER OWN WAY**

   Growth for children has many dimensions – social, emotional, physical, and intellectual. Growth is uneven and highly individual. All children do not reach the same level of growth at the same age, nor does a child grow in the same way in all areas.

PRINCIPLES OF GROWTH AND DEVELOPMENT

Basic principles that enable persons to guide children with a degree of assurance include:

1. **DIFFERENTIATION**

   Development proceeds from simple to complex. In both structure and activity, development is gradual in the direction of complexity and variety. Differentiated structures and functions become organized in new and more inclusive patterns.

2. **DISCONTINUITY OF GROWTH RATE**

   Development is never uniform or all at the same time. Various parts and systems grow at various rates at a different time. Growth shows characteristic spurts or peaks and then slows down to periods of relative latency.

3. **INTERRELATEDNESS OF GROWTH**

   Every aspect of the child's life affects every other aspect. The physical and social environment as well as factors of personality and physical development affects academic achievement.

4. **DIVERSITY OF GROWTH**

   No two children are exactly alike. No two grow quite alike. Wide differences exist among children of the same age, the same family, and from the same community. Each child has his or her unique growth style.

The teaching adult should be familiar with the levels of growth in each area, which may or may not correspond with the chronological age of each child.

OVERVIEW: Generally includes ages eleven to fifteen. Early adolescence is a period of rapid growth that transforms the child into an adult. It is the period in which the young person attains adult status, appearance and sexual maturity, in the physical sense. The adolescent develops formal or abstract thinking abilities.

PHYSICAL	SOCIO-EMOTIONAL	INTELLECTUAL
Eleven - twelve Year Old · Wide variations in physical maturity occur. Girls are about two years ahead of boys in beginning the adolescent cycle of growth and tend to reach physiological maturity earlier; girls tend to be larger and stronger than boys of the same age. · Marked physical changes may affect their energy; the child may easily tire. · May show awkwardness in movement due to rapid muscular and skeletal growth · Team spirit is strong; child may enjoy vigorous games.	Eleven - twelve Year Old · Is restless and eager for activity, exhuberant, outgoing and boisterous · Skills and boldness are admired. · Quarrels and makes up readily; responds to anger frequently and violently, physically and verbally · Similarity of interests and mental age increasingly influence choice of friends; has developed a strong loyalty to peers. · As puberty approaches, child may desire periods of aloneness and may show beginnings of shyness. · May have fears although may not admit it · Has a growing sense of humor	Eleven - twelve Year Old · Is capable of being absorbed in manipulative, constructive, and experimental activities · Ability to reason is on the increase, with an understanding of abstract ideas. Continued heightening of emotional susceptibility · Can understand human reproduction more fully

PHYSICAL	SOCIO-EMOTIONAL	INTELLECTUAL
	Eleven - Twelve Year Old (cont.) . Has admiration for the more skillful. . Is critical of adults, yet tends to act politely, factually, seriously, honestly, and confidingly with adults.	
Thirteen-Year-Old Is less awkward and angular Boys approach girls in height. Girls are still more physically mature than boys. Has very high energy level Muscular growth is rapid; restlessness may be a concomitant.	Thirteen-Year-Old . Is sometimes moody, withdrawn, and reflective . Has fewer friends . Sex consciousness may cause self-consciousness and shyness with opposite sex; however, the desire to tease appears as part of the sex attraction. Inner attitudes and tensions may be brought on by changes in body buildup and chemistry. . Often forms strong attachments to adults who show personal interest. Tendency to idol worship	Thirteen-Year-Old · Increases in critical thinking capacity · Is inclined to solve own problems; increasingly logical approaches to problems · Gains in memorizing ability

PHYSICAL	SOCIO-EMOTIONAL	INTELLECTUAL
Thirteen-Year-Old (Cont.) . Puberty cycle is still in progress; development of secondary sex characteristics continues. . Increases in height and weight may cause poor posture. . The heart may not develop rapidly enough to keep pace with unusual growth of body and limbs; fainting and dizziness may occur.	Thirteen-Year-Old (Cont.) . Conduct is influenced by the opinions of the group to which the boy or girl belongs. Attempts by adults to criticize their child's friend's qualities often intensify loyalties to the friend. Child may tend to reject parents or may feel rejected because of conflicts over behavior and authority relations.	
Fourteen-Year-Old . Girls are about two years ahead of boys at this age; sexual differences become more noticeable. . Posture is improving; general health is reflected in appearance. . Increased muscular development and resistance to fatigue make new skills and activities possible. More demanding sports may be played.	Fourteen-Year-Old . Is resentful of parental control; enjoys doing things independently . Group approval is of primary importance. . Expresses feelings freely; generally happy and friendly but does have short, explosive bursts of temper . Sexual manifestations may cause self-consciousness and, in turn, sexual delinquency may be caused by a feeling of non-belonging in the home.	Fourteen-Year-Old . Approaches crest of intellectual development, but judgment is far from mature . Uneven development occurs in various areas; the adolescent may be adult in grasping mental problems, yet remain a child in body and emotions.

PHYSICAL	SOCIO-EMOTIONAL	INTELLECTUAL
Fourteen-Year-Old (Cont.) . Increased control over accessory muscles makes possible many new skills and refinements in previous skills		Fourteen-Year-Old (Cont.) . Concepts of natural laws and physical relationships are almost fully developed. . Ability to use formal logic is generally superior to experimental capacity. . Usually strives for outstanding performance.
Fifteen-Year-Old . May have achieved physiological adulthood . Continued improvement in muscular coordination . Puberty cycle is completed in majority of cases. . May have periods of glandular instability with fluctuations in energy level; ailments may include headache, nose bleed, palpitation, nervousness and acne.	Fifteen-Year-Old . Is intensely emotional while trying to understand social relationships. . Is more cheerful, friendly, outgoing; shows better control of temper and feelings . Parent-adolescent conflict is at its peak. Adolescent has tendency to respond more to the influence of a teacher than of the parent. Conformity to group may be stronger than conformity to parental controls. . Likes to be independent; shows a "know it all" attitude . Interest in and emphasis on physical attractiveness and good grooming may be at their height.	Fifteen-Year-Old . Generally thinks clearly and logically . Deals well with abstract problems . Can make use of capabilities, e.g., becoming discussion leaders, assuming increasing responsibility for school activities . Is more apt to think independently . Is intellectually serious

Credits

CREDITS *

ART

DEVELOPERS AND WRITERS OF ORIGINAL MATERIALS

Grace George Alexander-Greene, Head of Art Unit
Jack Rosenbaum, Assistant to Head of Art Unit

WRITERS AND/OR DEVELOPERS OF REVISIONS

Cecille Davis, Supervisor of Art, C.S.D. #6
Ruth Danis, Teacher, P.S. 166Q

REVIEWERS AND ADVISORS FOR REVISIONS

Grace George Alexander-Greene, Head of Art Unit
Shirley Hochman, Supervisor of Art

BILINGUAL EDUCATION, AND ENGLISH-AS-A-SECOND LANGUAGE

DEVELOPERS AND WRITERS OF ORIGINAL MATERIALS

Hernan LaFontaine, Executive Administrator, Center for Bilingual Education
Marco A. Hernandez, Deputy Executive Administrator, Center for Bilingual Education
David Krulik, Assistant Director, Center for Bilingual Education
Lily C. Din, Teacher-Trainer
Bernice Forman, Teacher-Trainer
Ron LeDonni, Teacher-Trainer
Marvin J. Pekkala, Teacher-Trainer
Eli Plotkin, Teacher-Trainer
Burt Posner, Teacher-Trainer
Richard Quintanilla, Teacher-Trainer

REVIEWERS AND ADVISORS

Angela Bazley, Bilingual Project Director
Antonia Carranza, ESL/Bil. Coordinator, District 17
Barbara Gerard, Bilingual Project Director
Eleanor Jakubovitz, Bil. Coordinator, District 18
Jane London, Title VII Co-Coordinator, District 22

CAREER EDUCATION

DEVELOPER AND WRITER OF ORIGINAL MATERIALS

Dr. David A. Bickimer
Project Director,
Career Education Unit (1977)

REVIEWERS AND ADVISORS FOR REVISIONS

Juanita O. Ward
Project Director,
Career Education Unit
George R. Quarles
Chief Administrator,
Center for Career and Occupational Ed.

WRITER AND/OR DEVELOPER OF REVISIONS

Michael T. Quinn
Coordinator,
Career Education Unit

CHILD DEVELOPMENT FOCUS

DEVELOPERS AND WRITERS OF ORIGINAL MATERIALS

Hortense P. Jones, Director, Center for School Development
Thomas Cousins, Coordinator, Consumer Education Project
Adele Davidson, Early Childhood Supervisor
Elvina Goldfield, Assistant Coordinator, Follow Through Program
Carol Fineberg, Coordinator, Arts in General Education
Evelyn Jones, Facilitator, The Mini-Grant Program
Lois Knox, Educational Administrator, Follow Through Program
Marjorie McAllister, Coordinator, Follow Through Program
Sol Meldon, Coordinator, Gifted and Talented Program
Lilia Zarate, Psychologist, Follow Through Program

REVIEWERS AND ADVISORS

Teachers of Early Childhood classes in Community School Districts and the following Early Childhood Liaison persons:

Beatrice Brennan	District 1
Sandra Caruso	District 2
Norma O. Nurse	District 3
Norma Mingo	District 4
Eleanor Everett	District 5
Michele Jones	District 6
Carol B. Sanders	District 11
Inez Venable	District 12
Myra Briggs	District 13
Mary Driscoll	District 14
Josephine Ierelli	District 15
Edna Greenspan	District 16
Miriam Skolnick	District 17
Merle Hairston	District 18
Anita Harrison	District 19
Miriam Revkin	District 20
Ruth Abramowitz	District 22
Julia Washington	District 23
Virginia Lee	District 25
Barbara Pitts	District 27
Loretta McKillop	District 28
Barbara Slatin	District 29
Saria Zuckerman	District 31
Lorraine Feinman	District 32

COMMUNICATION ARTS

The Communication Arts section was developed jointly by the English Language Arts Unit and the Center for Reading.

*Titles and affiliations were those in force at the time the materials were prepared.

DEVELOPERS AND WRITERS

Anita Wilkes Dore, Director of English
Marian Train Power, Director (Acting) Center for Reading

James Anello, Principal - P.S. 188 K - District 21
Elva Collazo, Supervisor, Center for Reading
Marion Deutsch, Teacher - P.S. 197 - District 22
Marilyn Funes, Reading Specialist, Center for Reading
Marjorie Gaddy, Center for Reading
Rosalind Hanig, Teacher - P.S. 188 K - District 21
Joel Hillman, Diagnostic Testing Services
Beatrice Kachuck, Professor, Brooklyn College
Eileen Kramer, District Reading Coordinator - District 260
Etta Ladson, Assistant Principal, formerly - I.S. 142 Q, Now - Chancellor's Task Force on Attendance
Harold Minsky, Director of Diagnostic Reading Program - District 290
Edith Novod, Assistant Director of English, Center for the Humanities and the Arts
Gloria Ollick, Reading Coordinator - District 19
Benjamin Piltch, Reading Teacher - I.S. 530 - District 27
Lenore Ringler, Professor, New York University
Judith Schepis, Teacher Consultant
Rosemary Wagner, Curriculum Specialist - Retired

REVIEWERS AND ADVISORS FOR REVISIONS

Ruth Adams, Professor, City College
Lydia Romero de Alveres, Principal - P.S. 63 - District 1
Palma Baratta, Curriculum Specialist - District 30
Pamela Barth, Teacher - P.S. 13 K - District 19

Pat Shey Bischoff, Reading Teacher - District 31
Roy Blash, Principal, P.S. 65 - District 19
Woodrow Bovell, Assistant Principal, English - J.H.S. 258 K
Mary Buckley, Reading Coordinator - District 20
Robert De Lisle, Professor, Lehman College
Carmen Dinos, Professor, Brooklyn College
Lerida de Dios, Resource Teacher - District 24
Leonora Farber, J.H.S 231 - District 29
Joan N. Flig, Reading Teacher - I.S. 53 Q
Sylvia Glass, Teacher - P.S. 189 - District 6
Roslyn Gleimer, Reading Teacher - District 22
Dorothy Green, Teacher - P.S. 19 M
Jerome Green, Principal - P.S. 111 M
Maria Guasp, Bilingual Coordinator - District 19
P. Jerry Hutchins, Supervisor of Reading Bureau of Reading State Education Dept.
Hortense P. Jones, Director, Center for School Development
Michelle Jones, Title 1 Corrective Reading Coordinator
Stanley Kaplan - Principal, P. S. 152 M
Harriet Kaufman, Teacher - P.S. 13 K - District 19
Libby Kessler, Teacher _ P.S. 189 - District 6
Leslie Korant, Teacher Trainer - District 19
David Krulik, Assistant Director, Center for Bilingual Education
Marcia Lauffer, Reading Teacher - P.S. 65 - District 19
Muriel Mandell, Coordinator, WEDGE ESEA IV C
John Marcatante, Assistant Principal, English - I.S. 126 Q
Joseph Mehlman, Principal - P.S. 88 - District 24
Elaine Mitchell, Assistant Principal, English - I.S. 158 X
Elizabeth Mulligan, Teacher - P.S. 115 - District 6
Harvey Nagler, Principal - P.S. 35 - District 29
Ruth Peterkin, Teacher - P.S. 153 - District 6
Maria Power, Prinicpal - P.S. 13 - District 19
Leonore Ringler, Professor, New York University
H. Alan Robinson, Professor, Hofstra University
Florence Rosler, Reading Lab Teacher - P.S. 183 - District 27
Beverly Taylor, Reading Coordinator - District 6
Lucille Thomey, Assistant Director, Center for Library, Media and Telecommunications
E. Trowbridge, Teacher - P. S. 13K District 19
Barry Weider, Assistant Principal District 16

FOREIGN LANGUAGE

DEVELOPER AND WRITER

David Weiss, Asst. Director, Center for the Humanities and the Arts

REVIEWERS AND ADVISORS FOR REVISIONS

Chinese: Bernard Lee, Teacher, Seward Park H.S.
Gary Lee, Teacher, Murry Bergtraum H.S.

French: Emile Beux, Asst. Principal, Herbert H. Lehman H.S.
Roselle Meyrowitz, Asst. Principal, Midwood H.S.

German: William Muller, Teacher, J.H.S. 93Q
Caspar Scheiper, Asst. Principal, Curtis H.S.

Hebrew: Solomon Moskowitz, Associate in Secondary Education, Board of Jewish Education
Stanley Sobolofsky, Teacher, J.H.S. 141X

Italian: Adele Farella, Asst. Principal, New Dorp H.S.
Nivea Roman, Asst. Principal, Francis Lewis H.S.

CREDITS

Latin: Dr. Juno Blake, Teacher, Stuyvesant H.S.
Dominick Cerasulo, Teacher, Christopher Columbus H.S.

Russian: Anna Elman, Teacher, South Shore H.S.
Sylvia Maizell, Teacher, Bronx H.S. of Science

Spanish: Samuel LaRocca, Asst. Principal, August Martin H.S.
Lester Schweitzer, Asst. Principal, William H. Taft H.S.

FLES: Harriet Bryer, Principal, P.S. 177Q
Eleanor Roth, Teacher, P.S. 60Q

HEALTH EDUCATION

Melvin Warren, Assistant Director Health Education, writer.
Revisions were based on field evaluations.

HOME ECONOMICS

DEVELOPERS AND WRITERS

Kathleen V. Rogers
Home Economics
Olga E. Sobelsohn
Assistant Director
Sylvia B. Anker and Claire S. Rosenthal
Supervisors

INDUSTRIAL ARTS

DEVELOPERS AND WRITERS

Herbert Siegel, Director of Industrial Arts
Emanuel Gillers, Asst. Director of Industrial Arts
Samuel Garry, Supervisor of Industrial Arts
David Berlin, Supervisor of Industrial Arts - Special Education
Carl Brenner, Supervisor of Industrial Arts
Oh Cain, Teacher-Trainer of Industrial Arts - Special Education
Robert Fixler, Supervisor of Industrial Arts
Nathan L. Friedman, Supervisor of Industrial Arts

LIBRARY MEDIA

DEVELOPERS AND WRITERS

Geraldine Clark, Assistant Director, Head Library Unit, Center for Library, Media and Telecommunications
Lucille Thomas, Assistant Director, Elementary School Library Media Centers, Center for Library, Media and Telecommunications
Cathleen Mahoney, Elementary School Library Media Specialist, Center for Library, Media and Telecommunications
Betty Silvers, District Librarian, District 14
Mercedes Rowe, District Librarian, District 11
Lorrelle Henry, District Library Supervisor, District 16
Carol Redding, Library Media Specialist - I.S. 136

REVIEWERS AND ADVISORS

Lorrelle Henry, Library Supervisor, District 16
Janet Naftol, District Librarian, District 26
Mercedes Rowe, District Librarian, District 11
Betty Silver, District Librarian, District 14
Rhoda Kleiman, Library Media Specialist, JHS 167-M
Carol Redding, Library Media Specialist, IS 136-M
Ethel Olicker, Library Media Specialist, JHS 189-Q
Mary Knight, Library Media Specialist, JHS 263
Suzanne L. Burach, Pura Belpre Children's Caravan, District 16
Marian Bauman, P.S. 309, District 16
Elaine Kaufman, P.S. 215, District 27
Marilyn Yaiger, P.S. 345, District 19
Jim Amato, P.S. 305, District 13
Inez Rubin, P.S. 9, District 13
Dorothy Aranoff, P.S. 251, District 29
Claire Pressman, P.S. 181, District 29
Louise Miller, P.S. 287, District 13
Arlene Lichterman, P.S. 100, District 21
Robert Stavrakas, Principal, I.S. 7-R
Gloria Saunders, Principal, P.S. 299-K
Alvin, Yerman, Principal, P.S. 203-Q
Loretta Boyce, Principal, I.S. 383-K
Laura Goodman, UFT Library Media Committee
Shirley Rappaport, New York City School Librarians' Association

MATHEMATICS

DEVELOPERS AND WRITERS OF ORIGINAL MATERIALS

Frank J. Wohlfort, Asst. Director for Mathematics & Science
Alice Lombardi, Mathematics Coordinator District 24

REVIEWERS AND ADVISORS FOR REVISIONS

District Math Coordinators

Vincent J. Altamuro, Dist. 8
Kathleen K. Barry, Dist. 3
Jennie Berger, Dist. 16
Lillian Boyce, Dist. 17 (Aux. Trainer)
Shirley Brady, Dist. 17
Eric Calyo, Dist. 7
Janet Castellano, Dist. 31
Maria DeSalvio, Dist. 1
Louise M. Gemake, Dist. 4
Howard Goldstein, Dist. 18
Alfred Grab, Dist. 6
Zella C. Jackson, Dist. 5
Leah Karp, Dist. 11
Marvin Kreutzberger, Dist. 19
Aurora S. Larocca, Dist. 32
Sandra Lightbody, Dist. 14
Mary-Etta Maynor, Dist. 10
Mark Mendes, Dist. 23
Dorothy S. Minsley, Dist. 26
Stephen Rappaport, Dist. 23
Miriam R. Revkin, Dist. 20
Judith Ann Ries, Dist. 8
Matthew Scaffa, Dist. 31
Audrey Simon, Dist. 25
Hyacinth D. Stevens, Dist. 7
Sophie C. Sussman, Dist. 2

CREDITS

Mary J. Teshara, Dist. 12
Beatrice P. Williams, Dist. 27
Linda Zern, Dist. 7
Robert Atkins, Asst. Princ. John Adams HS
James Bruni, Prof. Math. Ed. Lehman College
Aaron Buchman, Assoc. Bureau of Math Ed, State Education Dept.
Edward Carroll, Prof, Math Ed. N.Y.U.
Jacob Cohen, Asst. Principal T. Roosevelt H.S.
Terrance Conaty, Teacher. JHS 117M
Ira Ewens, Principal James Madison HS
Jerome Fisher, Asst. Principal IS 218K
Thomas Fransko, Teacher, JHS 117M
Dorothy Geddes, Prof. Math Ed. Bklyn College
Blanche C. Gladstone, Corrective Math Specialist - Title I Corrective Mathematics Program
Edward Graybow, Teacher, JHS 117M
Cynthia Griffin, Teacher, JHS 117M
Harold Grill, Principal, JHS 104M
George Grossman, Dir. (retired), Center for Math & Science
Irwin Kaufman, Asst. Principal, South Shore H.S.
Henry Leighton, Asst. Principal, JHS 166K
Phillip Levine, Teacher, JHS 117M
Ira Lyons, Asst. Princ. IS 13M
George Mills, Principal, JHS 17M
Fred Paul, Chief, Bureau of Math Ed. State Education Department
Donald Rosen, Teacher, JHS 117M
Jerome Rosofsky, Principal, JHS 189Q
Walter Rubin, Asst. Principal, Truman High School; President Math Chairmen Assoc.
Harry Ruderman, Chairman Math, Hunter H.S.
Murray Soffer, Asst. Principal, IS 111K
Lucille A. Stovall, Coordinator - New York City Corrective Mathematics Program
Bruce Vogeli, Prof. Math Ed. Teachers College
Stephen S. Willoughby, Prof. of Math Ed., N.Y.U.

WRITERS AND/OR DEVELOPERS OF REVISIONS

Frank J. Wohlfort, Asst. Dir. Mathematics and Science
Charles Bechtold, Principal, P.S. 101Q
Shirley Brady, Math Coordinator, Dist. 17
Joseph Gehringer, Teacher, JHS 65M
Alan Ginsberg, Asst. Principal, JHS 125Q
Harriet Haynes, Teacher, JHS 88K
Marvin Kreutzberger, Math Coordinator, Dist. 19
Alice Lombardi, Mathematics Specialist, Center for Math and Science
Mary Teshara, Math Coordinator, Dist. 12
Leonard Zavlick, Asst. Principal, IS 167X

MUSIC

DEVELOPERS AND WRITERS

John Motley, Director of Music
Leo Sevush, Asst. Director of Music
Milton Friedman, Supervisor of Music, District 25
George Hall, Chairman of Music, Taft H.S.
Elton Warren, Supervisor of Music, District 9

Jeanette Carlstein, Supervisor of Music (Retired)

REVIEWERS AND ADVISORS

Selma Gold, Chairman of Music, Franklin K. Lane H.S.
Martin Gottesfeld, Chairman of Music, Martin Luther King H.S.
Asta Hairston, Supervisor of Music, District 17

PHYSICAL EDUCATION

DEVELOPERS AND WRITERS

Angela Zirpiades, Assistant Director, Physical Education
Lillian Vitaglione, Movement Specialist - P.S. 41 - wrote grades K - 6
Bernard Kirschenbaum, Assistant Director, Physical Education - wrote grades 7 - 9
Revisions were based on field evaluations and the new curriculum bulletin.

SCIENCE

DEVELOPERS AND WRITERS OF ORIGINAL MATERIALS

Sam Fried, Asst. Director, Science, Center for Mathematics and Science, Center for Curriculum and Instruction

Barry Wiesenfeld, Science Coordinator, District 24

REVIEWERS AND ADVISORS

Harold Alper, Chairman of the Science Standing Committee, Asst. Principal, Supervisor of Physical Science
Rose Blaustein, Science Coordinator, District 2
Arthur DeSantis, Science Coordinator, District 25
Leonard Epstein, Principal, P.S. 161K
Beatrice Fried, Science Coordinator, District 17
Rahla Gold, Principal, P.S. 92K
David Goldberg, Asst. Principal, Science, J.H.S. 296K
Sylvia Hecht, Coordinator, Bank Street College
Jay Littman, Asst. Principal, Science, I.S. 320K
Benjamin Litwin, Asst. Principal, Science, J.H.S. 223K
Joan Mulvaney, Principal, P.S. 180K
Ronald Novins, Asst. Principal, Science, I.S. 246K
Martin Schachter, Asst. Principal, Science, I.S. 10M
Samuel Silverberg, Asst. Principal, Science, J.H.S. 202Q
Lillian Silverman, Asst. Principal, Science, I.S. 292K
Thomas Vinci, Associate Dean, Graduate Studies, Fordham University
Alan Winkler, Science Resource Teacher. District 22

SOCIAL STUDIES

DEVELOPERS AND WRITERS OF ORIGINAL MATERIALS

Pearl Abrams, Teacher, P.S. 26Q

Jerry Blumengarten, Teacher, J.H.S. 166K
Carmen Farina, Teacher, P.S. 29K
Marilyn Fast, Asst. Principal, P.S. 89Q
Betty Garrett, Asst. Principal
Jeanette Hadley, Asst. Principal, P.S. 154M
Floyd Kessler, Teacher, I.S. 142Q
Joyce Rubin, Teacher, P.S. 276K
Joel Shulman, Teacher, P.S.108X

Alfred D. Herman, Principal, P.S. 139K
Miriam Iversen, Teacher, P.S. 26Q

REVIEWERS AND ADVISORS FOR REVISIONS

Charlotte Frank, Director, Center for Curriculum Development
Florence Jackson, Center Director, Center for Humanities and the Arts
Albert Post, Asst. Director, Social Studies
Geri Appel, Teacher, P.S. 34M
Alan Argoff, District Supervisor, C.S.D.#22
Martha Cember, Teacher, P.S. 236K
Janet Ernst, Teacher, P.S. 34M
Debbie Friedman, Teacher, P.S. 29K
Diana Kendall, Global Perspectives in Education
Elena Mancaruso, Teacher, P.S. 38K
Jean Milpilineos, Teacher, P.S. 52K
Shirley Pine, Teacher, P.S. 52K
Lorraine Rhodes, Teacher, P.S. 29K
Diane Rothman, Teacher, P.S. 29K
Barbara Schaeffer, Teacher, P.S. 52K
Zara Schenbaum, Teacher, P.S. 34M
Andrew F. Smith, Global Perspectives in Education

Lenore Wiesenberg, Teacher, P.S. 236K

(Standing Committee)
Alan Argoff, District Supervisor, C.S.D.#22
Morris Brown, Asst. Principal, Port Richmond High School
Bernard O'Kane, Asst. Principal, J.H.S. 218
Larry Pero, Asst. Principal, John Dewey H.S.
Irwin Rosenfeld, Asst. Principal, I.S. 44M
Harvey Seligman, Asst. Principal, I.S. 253

WRITERS AND/OR DEVELOPERS OF REVISIONS

Florence Jackson, Center Director, Center for the Humanities and the Arts
Albert Post, Asst. Director, Center for the Humanities and the Arts
Jerry Blumengarten, Teacher, J.H.S. 166K
Martin Cohen, Asst. Principal, Halsey J.H.S.
Alfred D. Herman, Principal, P.S. 139K

TYPEWRITING

DEVELOPERS AND WRITERS

Norman E. Watnick
Assistant Director,
Business and Distributive Ed.
Donald Donin
Coordinator, Business and
Distributive Ed.

REVIEWERS AND ADVISORS

Shirley Silvers, Dept. of Business. Queens Community College
Robert G. Fleig, Bureau of Business Education, State Education Dept.
Catherine Stapleton, President JHS Typewriting Teachers' Association
Anne Pennino, Chairperson
Secretarial Studies
Standing Committee

EDITORIAL STAFF

CENTER FOR CURRICULUM DEVELOPMENT

Susan S. Aaron
Regina Barnes
Marie Bobetsky
Maureen Maguire
Alaire Mitchell (Project Editor)
Gertrude Blaustein (Proofreading assistant)
Rosemary Stroer (Editing - experimental edition)

APPENDIX
CURRICULUM PUBLICATIONS

PRINTED PUBLICATIONS

Available from:

****

Publication Sales Office
New York City Board of Education
110 Livingston Street
Brooklyn, New York 11201

****

ART

Art in the Elementary Schools
1963-64, No. 8: 146 p.

Art for the Middle School
1977-78, No. 3: 127 p.

Art Teaching Guides: Puppets and Puppetry
1968-69, No. 8h (Reprinted 1975):
20 p.

COMMUNICATION ARTS

Handbook for Language Arts: Pre K-Grade 2
1965-66, No. 8 (Reprinted 1975): 416 p.

Sequential Levels of Reading Skills:
Grades Pre K-12
1967-68, No. 4 (Reprinted 1970, 1975
1979): 324 p.

Handbook for Language Arts: Grades 3 and 4
1969-70, No. 6: 360 p.

Handbook for English Language Arts,
Grades 5-12: Reading and Literature
1967-68, No. 10 (Reprinted 1969,
1975, 1979): 324 p.

Handbook for English Language Arts,
Grades 5-12: Speech and Composition
1969-70, No. 21: 221 p.

Handbook for English Language Arts:
Grades 5-12: Language Strand
1974-75, No. 4: 286 p.

ENGLISH AS A SECOND LANGUAGE

ESL: Teaching English as a Second
Language in the Middle Grades
1967-70, No. 7: 190 p.

FOREIGN LANGUAGES

Chinese: Levels 1 and 2
1972-73, No. 7: 165 p.

German: Levels 1-4
1966-67, No. 11c: 222 p.

Hebrew: Levels 1-4
1966-67, No. 11b: 207 p.

Latin: Levels 1-4
1967-68, No. 19: 146 p.

Russian: Levels 1-4
1970-71, No. 6: 224 p.

HEALTH EDUCATION

Health Education in the Elementary
Schools
1969-70, No. 2: 249 p.

Health Education in the Secondary
Schools
1972-73, No. 10: 341 p.

HOME ECONOMICS

Home Economics Grades 7-8-9 **
1963-64, No. 4: 169 p.

Young New Yorker's Cookbook
1973-74, No. 9: 244 p.

INDUSTRIAL ARTS

Ceramics for Secondary Schools
1961-62, No. 7 (Reprinted 1966, 1974): 130 p.

Industrial Ceramics
1971-72, No. 5: 133 p.

Drafting Experiences for Intermediate School Pupils: A Resource Bulletin for Teachers of Industrial Arts
1966-67, No. 9 (Reprinted 1970): 75 p.

Electricity - Electronics for Intermediate and Junior High School
1970-71, No. 11: 196 p.

Graphic Arts Grades 7-8-9
1965-66, No. 13: 65 p.

Metalworking for Secondary Schools
1966-67, No. 7: 191 p.

Woodworking: Grades 7-8-9
1965-66, No. 14: 67 p.

Industrial Arts Woodworking: Secondary Schools
1963-64, No. 10 (Reprinted 1969): 111 p.

MATHEMATICS

Mathematics: Pre K-1, Part 1
1966-67, No. 6a (Reprinted 1968, 1974): 67 p.

Mathematics: Pre K-1, Part II
1966-67, No. 6b: 150 p.

Mathematics: Grade 1 - Scope and Sequence
1970-71, No. 2: 16 p.

Mathematics: Grade 2
1977-78, No. 11: 180 p.

Mathematics: Grade 3
1977-78, No. 9: 172 p.

Mathematics: Grade 4 and Grade 5 - Scope and Sequence
1969-1970, No. 8 (Reprinted 1973, 1975): 46 p.

Mathematics: Grade 6 - Scope and Sequence
1970-71, No. 4: 22 p.

Mathematics: 9th Year
1966-67, No. 4 (Reprinted 1969): 304 p.

General Mathematics: 8th Year
1964-65, No. 16 (Reprinted 1968, 1970): 270 p.

MUSIC

Teaching Music: Grades K-4
1978-79, No. 5: 99 p.

SCIENCE

Science: Grades K-2
1965-66, No. 7 (Reprinted 1968, 1970, 1975): 267 p.

Science: Grades 3-4
1966-67, No. 11 (Reprinted 1969, 1975): 339 p.

Science: Grade 5
1968-69, No. 6 (Reprinted 1974): 264 p.

Science: Grade 7
1971-72, No. 2: 313 p.

Science: Grade 8
1967-68, No. 20: 400 p.

Science: Grade 9
1968-69, No. 9: 309 p.

SOCIAL STUDIES

Grade 1: Living and Working Together in the Community
1967-68, No. 26 (Reprinted 1970, 1976): 113 p.

Grade 2: How People Live in City Communities Around the World
1968-69, No. 2: 199 p.

Grade 4: American People and Leaders: How the United States Began and Grew
1968-69, No. 3: 130 p.

Grade 7: American History: Historical Development of the United States
1967-68, No. 2e (Reprinted 1970): 130 p.

Grade 9: World Studies: Eastern Civilizations - Regional Studies (Revised Edition)
1969-70, No. 12: 397 p.

EXPERIMENTAL PUBLICATIONS

Available from:

Office of Curriculum Development and Support
New York City Board of Education
131 Livingston Street Room 619
Brooklyn, New York 11201

ART

Art in the High School
May 1974: 102 p.

FOREIGN LANGUAGES

Foreign Language Revision Program:
French
June, 1975,: 99 p.

Foreign Language Revision Program:
Italian
June, 1975: 99 p.

Foreign Language Revision Program:
Spanish
June, 1975: 102 p.

INDUSTRIAL ARTS

Industrial Arts Aerospace for
Intermediate and Junior High
School, Part 2
August, 1970: 120 p.

Graphic Arts for Secondary Schools
March, 1970: 159 p.

Paste Make-up -- A Teaching Guide
Summer, 1970: 76 p.

Plastics for Secondary Schools
June, 1967: 195 p.

School Shop Safety Manual
October, 1977: 225 p.

Teachers Handbook for the Handicapped **

** Available from:

Industrial Arts Unit
New York City Board of Education
347 Baltic Street Room 102
Brooklyn, New York 11201

MATHEMATICS

Fundamentals of Mathematics, Part 1
November, 1978: 144 p.

Fundamentals of Mathematics, Part 2
November, 1978: 136 p.

MUSIC

Teaching Music, Grades 5 and 6
December, 1975: 106 p.

SCIENCE

Investigating our Environment, Science
Grade 6
June, 1974: 248 p.

SOCIAL STUDIES

Grade 8: Urban Growth: Citizenship in
a Changing Society
December, 1978

FACULTY PRESS, INC., BROOKLYN, N.Y.